CHAPTER 4 SURFACE WATER QUALITY MANAGEMENT IN NEW MEXICO

PROGRAMS FOR SURFACE WATER QUALITY ASSESSMENT

Water quality assessment is an integral part of water quality management in New Mexico. Information on water quality serves as a basis for various program decisions. Moreover, statewide assessments of surface quality are an important component of this federally required report. Monitoring activities and programs used by New Mexico to assess surface water quality are described below.

Assessment Process Overview

Pursuant to Section 106(e)(1) of the Federal Clean Water Act (CWA), the SWQB has established appropriate monitoring methods, quality assurance/ quality control (QA/QC) procedures, and assessment methodologies in order to compile and analyze data on the quality of the surface waters of New Mexico. In accordance with the *New Mexico Water Quality Act*, the SWQB has developed and implemented a comprehensive water quality monitoring strategy for the surface waters of the State. The monitoring strategy establishes methods of identifying and prioritizing water quality data needs, specifies procedures for acquiring and managing water quality data, and describes how these data are used to progress toward three basic monitoring objectives: to develop water quality-based controls, to evaluate the effectiveness of such controls, and to conduct water quality assessments.

Similar to most other states, SWQB utilizes a rotating basin system approach to water quality monitoring. Using this approach, a select number of watersheds are intensively monitored each year with an established return frequency of approximately every seven years. Revisions to the schedule may be occasionally necessary based on staff and monetary resources that fluctuate on an annual basis. It should also be noted that a watershed is not necessarily ignored during the years in between intensive sampling. The rotating basin program is supplemented with other data collection efforts such as the funding of long-term USGS water quality gaging stations for long-term trend data (Appendix D).

SWQB maintains current quality assurance and quality control plans that cover all monitoring activities. This document called the *Quality Assurance Project Plan* (QAPP) is updated and certified annually by EPA Region 6 (SWQB/NMED 2004a). When an intensive surveys is completed, all data are checked against QA/QC measures identified in the QAPP and assessed to determine whether or not designated uses detailed in the current *State of New Mexico Standards of Interstate and Intrastate Surface Waters* (20.6.4 NMAC) are being met. In New Mexico, surface water data are assessed according to the *State of New Mexico Procedures of Assessing Standards Attainment for the Integrated §303(d) /§305(b) Water Quality Monitoring and Assessment Report* (otherwise known as the "assessment protocol") (SWQB/NMED 2004b). The United States Environmental Protection Agency (USEPA) does not officially approve individual state's assessment protocols, but they do provide review and comment and consult the document when reviewing the state's draft integrated list. The assessment protocol is periodically updated and is generally based on current EPA assessment guidance.

All summary assessment data is housed in the USEPA-developed Assessment Database version 2 (ADB v.2) (RTI 2002). Use attainment decisions are then summarized in the *Integrated CWA §303(d)/305(b) Water Quality Monitoring and Assessment Report*. This report is prepared every even numbered calendar year as required by the CWA. Category 5 assessment units on this integrated list (see Section 4.0) constitute the *CWA §303(d) List of Impaired Waters*. The integrated list portion of the report is opened for a minimum 30-day public comment period. Response to Comments are prepared by SWQB and submitted to USEPA Region 6 for review and approval. SWQB also submits the Record of Decision (ROD) document. The ROD is an additional, non-required document that SWQB provides to USEPA and the public, which explains why, and when a particular AU was added and, if applicable, why and when it was removed from Category 5 of the integrated list. All the above-mentioned documents developed and maintained by the SWQB are available on the SWQB web page: http://www.nmenv.state.nm.us/swqb.

Surface Water Quality Monitoring

Water quality monitoring and other surveillance activities provide water quality data needed to (1) revise water quality standards, (2) establish waterbody monitoring/management priorities, (3) develop water quality-based effluent limitations, (4) develop total maximum daily load (TMDL) planning documents, (5) assess the efficacy of point source water pollution controls through the National Pollutant Discharge Elimination System (NPDES), (6) identify new areas of concern such as the statewide fisheries mercury study, and (7) evaluate the efficacy of best management practices (BMPs) developed to mitigate the impact of nonpoint sources.

Water quality data are acquired by four basic forms of monitoring: (1) ambient, fixed station monitoring performed by the USGS; (2) special intensive rotational water quality surveys of priority waterbodies by NMED; (3) effluent monitoring; and (4) nonpoint source project monitoring. SWQB also occasionally conducts special studies when additional information is needed to develop or revise TMDL planning documents, or to investigate specific water quality concerns from the public. SWQB also solicits additional available outside data by publishing a public notice call for data.

USGS Ambient Surface Water Quality Monitoring

In addition to intensive and special water quality surveys, the SWQB has for many years relied on water quality data collected by the USGS from a series of long-term fixed stations. Through 1995, the USGS maintained a network of 49 long-term fixed stations, located in almost every watershed in the State. The primary objective of this fixed station network has been to provide long-term measurements of water quality variables at representative points on the State's major streams to determine spatial and temporal water quality trends. These data are also used for determining TMDLs for these waterbodies as required. Prior to 1996 the funding for this sampling effort was provided by an ap-

propriation from the Legislature to the State Engineer Office, along with an equal match from USGS. In June 1996 the State Engineer Office withdrew all future funding for water quality data collection and concentrated on funding the stream flow studies. Currently, the SWQB though funding provided by the New Mexico Legislature on a year-to-year basis has the USGS sample a variety of parameters at selected USGS gaging stations each year. The exact list of parameters and stations is reviewed and revised each year depending on current and projected data needs. Appendix D lists the stations that were funded for FY2003. This valuable long-term monitoring network depends upon continued annual funding from the New Mexico Legislature.

In addition to the fixed-station water quality stations maintained by USGS there is one additional station yielding valuable water quality data for the State. This station is part of the National Stream-Quality Accounting Network (NASQAN) and is located on the Rio Grande in Texas just outside the New Mexico state boundary.

SWQB Intensive Watershed Stream Surveys

Intensive watershed water quality surveys involve eight one-day sampling trips spread out through the three seasons. During each trip, water quality samples are collected and measurements are made of physical parameters at representative stations along a stream reach. SWQB is currently attempting to conduct water quality sampling efforts in each of the State's watersheds every seven years. The purpose of these investigations is to determine water quality characteristics under specific conditions, and to determine where possible, cause and effect relationships of water quality.

Special surveys are usually timed to include periods of stress for the fish and macroinvertebrates of the waterbody, such as periods of annual low streamflow or highest ambient temperatures. Benthic macroinvertebrate assessments to evaluate the integrity of aquatic communities were conducted in association with most of these stream surveys. Extensive information regarding which pa-

rameters are sampled, sampling frequency, rationale behind study plans, etc., is found in the QAPP which is updated annually (SWQB/NMED 2004a).

SWQB Lake and Reservoir Monitoring

Lake and reservoir monitoring in New Mexico is conducted to (1) collect information for standards development and to determine the trophic status for all publicly-owned or operated lakes where little or no physical, chemical, or biological information exits; and (2) update information with regard to trophic status of previously studied publicly-owned lakes. Lake surveys generally consist of three-season sampling efforts from one or two stations. Surveys for small lakes are usually conducted during the period of maximum stress to the aquatic ecosystem.

SWQB Effluent Monitoring

Receiving streams are periodically sampled in conjunction with effluent samples collected during Compliance Sampling Inspections at NPDES permitted discharge facilities. Inspectors collect samples from the discharge pipe as well as from an upstream station and a downstream station, to bracket the discharge. This group of samples provides information on the impact, if any, of the discharge on the chemical quality of the receiving stream. The information is primarily used to determine compliance with permit limits.

Non Point Source CWA §319 Project Monitoring

NMED and CWA 319 grant recipients conducts water quality monitoring around the State to determine the effectiveness of BMPs used to control nonpoint source (NPS) pollution. Monitoring is also conducted in conjunction with targeted watershed demonstration projects. Intensive implementation of BMPs is ongoing in several watersheds to improve water quality. On a statewide basis, NM,

CWA 319 recipients, and various state and federal agencies monitor selected projects in priority waterbodies such as timber harvests, road construction and dredge-and-fill activities to determine the effectiveness of BMPs used to protect water quality in these projects.

NPS monitoring typically includes determinations of whether BMPs are being implemented as planned, and water quality sampling upstream and downstream of actual or potential NPS problem areas. In the case of short-term projects such as a utility line crossing of a river, monitoring may be done only once or twice during the project. In these projects, turbidity monitoring is often used as an indicator of erosion control effectiveness on the project. If turbidity standards are violated, additional water quality parameters may also be checked.

In the case of monitoring watershed improvement projects, samples are often collected seasonally over a multi-year period. Water quality is monitored upstream and downstream of all major NPS problems and control BMPs implemented in the watershed. Sampling repeatedly over a multi-year period will allow the State to document the effectiveness and feasibility of watershed restoration projects in improving water quality. As discussed previously, other indicators of improvement are being developed and implemented.

WATER QUALITY IN ASSESSED SURFACE WATERS

Individual Designated Use Support Determinations

Designated uses have been established by the New Mexico Water Quality Control Commission (WQCC) at the recommendation of SWQB for most perennial surface waters in New Mexico. These include aquatic life uses, recreational and domestic uses, municipal and industrial water supplies, irrigation and livestock watering and wildlife habitat. Numeric and narrative water quality standards are established by the WQCC to protect designated, existing, and attainable uses. These standards are consistent with the CWA goals which provide for the protection and propagation of fish, shellfish

and wildlife, as well as providing for recreation in and on the waters. Assessed surface waters are those assessment units for which the State can determine levels of designated use support by applying the assessment protocols to monitored data. The process of determining attainment is extensive and will not be included in this report because the assessment protocol document provides a comprehensive explanation of the way the State assesses chemical/physical, biological, toxicological, and pathogen data in order to determine designated use attainment status (SWQB/NMED 2004b).

The State's assessment protocol is largely based on recent EPA guidance (USEPA 2002, USEPA 2003) but has been modified to meet the special needs and circumstances of New Mexico (SWQB/NMED 2004b).

Water quality criteria necessary to protect aquatic biota from toxic pollutants, which have been adopted in New Mexico's water quality standards, are listed in Table 4.1. As part of the 1998 triennial review of stream standards, New Mexico adopted in early 2000 these chronic and acute numeric water quality criteria. In addition, numeric criteria for toxicants for the uses of irrigation, domestic water supply, livestock watering and wildlife habitat were developed. The majorities of these criteria are for the dissolved fraction of the metals, and are largely based on criteria in EPA's Quality Criteria for Water 1986 (USEPA 1995) or on updates to this document. The assessment protocol provides a detailed explanation of how individual use attainment status related to toxic pollutants, as well as conventional parameters and bacteriologic parameters, is determined (SWQB/NMED 2004b).

~~**WATER QUALITY IN ASSESSED SURFACE WATERS**~~

~~**Methodology**~~

~~Information about surface water quality throughout New Mexico is based on the results of the New Mexico Environment Department's (NMED) intensive surveys, project-by-project monitoring of selected nonpoint source control efforts, preliminary results of a statewide ultra-clean study to determine low-level mercury contamination in stream waters and sediments, and the development of Total Maximum Daily~~

Loads (TMDLs). Water quality information is also obtained from data collected by NMED staff during inspections of wastewater treatment facilities, review of Discharge Monitoring Reports submitted by individual wastewater dischargers, the State's voluntary monitoring project "Watching Our Waters," and a review of physical, chemical and biological data entered by all agencies into STORET, the United States Environmental Protection Agency's (USEPA's) computerized database. Additional water quality information was included from results of historical water quality surveys, investigations resulting from information provided by concerned citizens, and fisheries data where available.

Assessment Strategy

Assessed waters are those waterbodies for which the State can determine levels of support for designated uses established in the *Assessment Protocol: State of New Mexico Procedures for Assessing Standards Attainment for § 303(d) List and § 305(b) Reports* as well as for the goals of the federal Clean Water Act (CWA) (**1**). Designations are established by the New Mexico Water Quality Control Commission (WQCC) for most perennial surface waters in New Mexico. These include fisheries, recreational and domestic uses, municipal and industrial water supplies, irrigation and livestock watering and wildlife habitat. Numeric and narrative water quality standards are established by the WQCC to protect designated, existing and attainable uses. These standards are consistent with the CWA goals which provide for the protection and propagation of fish, shellfish and wildlife, as well as providing for recreation in and on the waters.The categories of assessment are "monitored" and "evaluated":

- "Monitored waters" are those waterbodies for which current (≤ five years old), site-specific physical/chemical water quality data are sufficient to make a use support decision. These data are compared to numeric and narrative criteria in the State's water quality standards. Where available, biological data are also used to determine whether designated uses are supported;
- "Evaluated waters" are those waterbodies where insufficient or old data exist to consider the waterbody "monitored," but where other information permits an evaluation of the use support status. New Mex-

ico's evaluated assessments are based on data older than five years, data not fully meeting Quality Assurance/ Quality Control standards, citizens' monitoring or reports of impairment, or on professional evaluations by NMED or water resource professionals from other state or federal agencies.

Levels of support for designated uses are determined for individual waterbodies as follows:

- Fully supporting: all uses are fully supported;
- Fully supporting, impacts observed: all uses are fully supported; however, impacts have been seen and documented;
- Partially supporting: one or more uses are adversely affected, but not precluded, by pollution and the remaining uses are fully supported; and
- Not supporting: one or more uses are at least temporarily precluded by man-made or man-induced pollution.

The State's Assessment Protocol of monitored waters depends primarily on ambient physical/chemical, biological, and other types of available data. It also uses fish tissue data from a study begun in 1991. Data from biological surveys and biomonitoring tests are becoming available and are incorporated into the State's Assessment Protocol where available.

Criteria used for determining designated and overall use support are summarized in Table 2. These criteria are largely comparable to those recommended by EPA in guidelines (**1**) for this document but have been modified to meet the special needs and circumstances of New Mexico.

For this report, New Mexico has chosen to designate uses as "partially supported" when waters show exceedances of chronic criteria for toxicants unless exceedances of other criteria indicate that impairment is serious enough to warrant the designation of "not supported." In waters where more than one toxicant exceeds acute criteria at significant levels, we have stated that a use is "not supported."

~~Water quality criteria necessary to protect aquatic biota from toxic pollutants, which have been adopted in New Mexico's water quality standards, are listed in Table 3. As part of the 1998 triennial review of stream standards, New Mexico adopted in early 2000 these chronic and acute numeric water quality criteria. In addition, numeric criteria for toxicants for the uses of irrigation, domestic water supply, livestock watering and wildlife habitat were developed. The majorities of these criteria are for the dissolved fraction of the metals, and are largely based on criteria in EPA's Quality Criteria for Water 1986 (**2**) or on updates to this document.~~

~~New Mexico's chronic criteria are applied to the arithmetic mean of results of samples collected using applicable protocols. Most waters in the state have been fully assessed for compliance with chronic criteria. However, some waters were evaluated based on grab samples for total or dissolved metals. Grab samples are single water samples taken on a single day, therefore these results are appropriately compared with acute water quality standards.~~

Table 2. Criteria for Determination of Designated and Aquatic Life Use Support.

		Support of Designated Uses[a]			
Assessment Basis	**Assessment Description**	**Fully Supporting**	**Fully Supporting, Impacts Observed**	**Partially Supporting**	**Not Supporting**
Evaluated	Available data more than 5 but less than 10 years old OR if no site specific data, assessment based on land use, location of sources and on site professional evaluation.	Available historical data indicate criteria are met AND no point or nonpoint sources are known to be present which could interfere with the uses.		Available historical data indicate criteria are violated OR sources are present which affect uses OR no known sources exist but water quality complaints are on record OR evaluation by professional indicates use impairments.	Available historical data indicate criteria often or significantly violated OR the multitude or magnitude of sources indicate uses are not supported. Documented non compliance of narrative surface water standards. Waters with fishing, swimming or drinking water advisories in effect.
Monitored (Biological)	Available data no more than 5 years old. Site visited by qualified biologist. Recognized bioassessment protocols used. Benthic macroinvertebrate taxonomic identifications made to at least the family level using protocol comparable to EPA's "*Rapid Bioassessment Protocols for Use in Streams and Rivers*."	No evidence of modification to indigenous or established community. Comparable to best situation expected within eco-system (watershed reference site). Balanced trophic structure. Optimum community structure (composition & dominance) for stream size and habitat quality.	Community structure less than expected. Composition (species richness) lower than expected due to loss of some intolerant forms. Percent contribution of tolerant forms increases.	Some modification of community noted OR biomonitoring demonstrates behavioral modification or decreased fecundity. Fewer species due to loss of most intolerant forms. Reduction in EPT index[b].	Use clearly not supported, definite modification of community noted. Biomonitoring demonstrates significant lethality. Few species noted. If high densities of organisms, then dominated by one or two taxa.
Monitored (Chemical /Physical)	Available data no more than 5 years old. Fixed station sampling, intensive surveys, or rigorous reconnaissance surveys. Chemical analysis of water, sediment or biota.	For chemical/physical parameters[c], criteria exceeded in ≤ 7% of measurements within a 5-year period. If criteria are exceeded in 7 to 15% of the measurements within a 5 year period, the water body is listed as *Fully Supporting, Impacts Observed*.	For chemical/physical parameters[c], criteria exceeded in ≥ 7% but ≤ 15% of the measurements within a 5 year period.	Within a 5 year period, criterion for any parameter[c] is exceeded in a 15-25% range of measurements OR one toxic pollutant exceeds EPA acute criteria by ≥ 1.5 times but ≤ 2 times the acute standard.	Criteria for the grouped parameters[c] exceeded in ≥ 25% of measurements within a 5-year period. Criteria for any two or more toxic pollutants exceed (≥ 2 times) the EPA's acute water quality standard.
Monitored (CWA § 307(a)[d] Toxics including ammonia and cholorine)	Available data no more than 5 years old. Fixed station sampling, intensive surveys, or reconnaissance surveys. Only acute values currently used for toxicology determinations.	No measured toxic pollutants[d] exceed EPA acute criteria.	For any one parameter[d], one exceedance of the acute or chronic criteria or chronic screening level within a 5 year period. FSIO listing begins if toxin is ≥ 1.5 times the chronic standard.	For any one parameter[d], more than one exceedence of the acute or chronic criteria or chronic screening level within a 5 year period and in < 25% of samples.	For any one parameter[d], more than one exceedence greater than the acute or chronic criteria within a 5 year or 3 year period respectively and in ≥ 25% of the samples.
Monitored (Using Stream Morphology[e])	Available data no more than 5 years old. Recognized stream morphology protocols used.	Data indicate only slight modification of stream morphology using a quantifiable tool. Stream is stable.	Data shows moderate alterations which are localized and do not show impacts outside of a reasonable recovery area.	Modification to stream morphology significant and with broad scale. Quantifiable assessments of stream morphology show vertical and/or horizontal instability.	Stream morphology severely altered. Severe bank failure and/or hydrological changes. Accelerated upland erosion.

a *Fully Supporting* = All designated uses fully supported; *Fully Supported, Impacts Observed* = All designated uses fully supported but is reasonably expected to exceed criteria for at least one designated use in the next two year reporting period; *Partially Supporting* = One or more designated uses partially supported and all other designated uses fully supported; and *Not Supported* = One or more designated uses not supported.

b EPT index is the total number of distinct taxa within the orders *Ephemeroptera , Plecoptera,* and *Trichoptera*. This value summarizes taxa richness within the insect orders that are generally considered to be sensitive to pollution.

c Conventional pollutants to be grouped for the determination of aquatic life use support are temperature, turbidity, pH, dissolved oxygen and total phosphorus.

d Refers to priority pollutants identified in CWA § 307(a). Toxicants include metals, pesticides, organics, ammonia, cyanide and chlorine (See Table 3, page 76). Currently, insufficient data are collected to use chronic toxicity values to determine use support decisions based on New Mexico Water Quality Standards.

e These assessments will be made using assessment tools currently being developed by the Nonpoint Source Pollution Section of the Surface Water Quality Bureau in the New Mexico Environment Department. Further modifications to this table will be necessary as the tool is modified and tested.

Table ~~3~~4.1. New Mexico Fishery Use Protection Numeric Water Quality Standards For Toxicants

Chronic Criteria [a]		
Dissolved Arsenic	150	ug/l
Dissolved aluminum	87.0	ug/l
Dissolved beryllium	5.3	ug/l
Total mercury	0.012	ug/l
Total recoverable selenium	5.0	ug/l
Cyanide, weak acid dissociable	5.2	ug/l
Total chlordane	0.0043	ug/l
Dissolved cadmium[c]	$(e^{(0.7852[\ln(\text{hardness})]-2.715)})$ (cf)	ug/l
Dissolved chromium[d]	$e^{(0.819[\ln(\text{hardness})]+0.534)}$	ug/l
Dissolved copper	$e^{(0.8545[\ln(\text{hardness})]-1.7428)}$	ug/l
Dissolved lead[e]	$(e^{(1.273[\ln(\text{hardness})]-4.705)})$ (cf)	ug/l
Dissolved nickel	$e^{(0.846[\ln(\text{hardness})]+0.0554)}$	ug/l
Dissolved zinc	$e^{(0.8473[\ln(\text{hardness})]+0.8699)}$	ug/l
Total chlorine residual	11	ug/l
Acute Criteria [b]		
Dissolved arsenic	340	ug/l
Dissolved aluminum	750	ug/l
Dissolved beryllium	130	ug/l
Total mercury	2.4	ug/l
Total recoverable selenium	20.0	ug/l
Dissolved silver	$e^{(1.72[\ln(\text{hardness})]-6.6825)}$	ug/l
Cyanide, weak acid dissociable	22.0	ug/l
Total chlordane	2.4	ug/l
Dissolved cadmium [c]	$(e^{(1.128[\ln(\text{hardness})]-3.6867)})$ (cf)	ug/l
Dissolved chromium [d]	$e^{(0.819[\ln(\text{hardness})]+2.5736)}$	ug/l
Dissolved copper	$e^{(0.9422[\ln(\text{hardness})]-1.7408)}$	ug/l
Dissolved lead[e]	$(e^{(1.273[\ln(\text{hardness})]-1.46)})$ (cf)	ug/l
Dissolved nickel	$e^{(0.8460[\ln(\text{hardness})]+2.253)}$	ug/l
Dissolved zinc	$e^{(0.8473[\ln(\text{hardness})]+0.8618)}$	ug/l
Total chlorine residual	19	ug/l

[a] The chronic criteria shall be applied to the arithmetic mean of results of samples collected using applicable protocols. Chronic criteria shall not be exceeded more than once every three years.

[b] The acute criteria shall be applied to any single grab sample. Acute criteria shall not be exceeded.

[c] For numeric standards dependent on hardness, hardness (as mg $CaCO_3$/L) shall be determined as needed from available verifiable data sources including, but not limited to, the United States Environmental Protection Agency's STORET water quality database. The hardness-dependant formulæ for metals are only valid for hardness values of 0-400 mg/L. For values above 400 mg/L, 400 will be used. The harness-dependant formulae for cadmium must be multiplied by a conversion factor (cf) to be expressed as dissolved values. The chronic factor for cadmium is cf=1.101672 –[(ln hardness)(0.041838)]. The acute factor for cadmium is cf=1.136672 –[(ln hardness)(0.041838)].

[d] The criteria for chromium shall be applied to an analysis which measures both the trivalent and hexavalent ions.

[e] The harness-dependant formulae for cadmium must be multiplied by a conversion factor (cf) to be expressed as dissolved values. The chronic and acute factor for lead is cf=1.46203 –[(ln hardness)(0.145712)].

Geographic and water quality assessment conclusions for the majority of New Mexico's perennial rivers and streams have been entered into the latest version of EPA's Assessment Database (ADB) software (ADB v.2). ADB v.2 allows for more detailed reporting of the overall health of a waterbody, the number of miles affected by various pollutants, and the extent of designated use support. The information in the database was used to provide many of the tabulations in this report. Because of more detailed tracking, the miles of streams with impaired uses may vary from previous reports.

The Integrated List (Appendix B) summarizes, on an assessment unit basis, designated use impairment status and categorization for New Mexico lakes, reservoirs, rivers, and streams. Appendix B also identifies the causes and probable sources of use nonattainment based on the standardized national lists of impairment causes and sources.

Individual Use Support in the New Mexico's Streams and Rivers

Table 4.2 contains a summary of individual designated use support for stream and rivers. The Clean Water Act goal of "fishable" is now reported under the various fisheries uses currently in New Mexico's water quality standards document, and the "swimmable" goal is reported under primary and secondary contact uses. EPA developed this method through a consensus approach to reduce inconsistencies in states' reports. Overall, 5 of the State's 15 assessed designated uses have been impaired by point or nonpoint sources of pollutants. All subcategories of coldwater fishery along with warmwater fishery uses, as well as the irrigation, secondary contact, wildlife habitat, and livestock watering uses have been impaired.

Table 4.2. Individual Use Support Summary for New Mexico Streams

Report for Water Type: STREAM/CREEK/RIVER; Units: MILES

USE	Total Size	Size Fully Supporting	Size Fully Supporting and Threatened	Size Not Supporting	Size Not Assessed	Size with Insufficient Info
Coldwater Fishery	948.29	383.37	0	506.8	28.37	29.75
Domestic Water Supply	2432.23	2116.23	0	0	316	0
Fish Culture	1838.92	1725.16	0	3.4	110.36	0
High Quality Coldwater Fishery	2325.95	709.47	0	1185.54	260.26	170.68
Industrial Water Supply	1049.49	909.01	0	0	140.48	0
Irrigation	5919.66	5449.65	0	137.79	310.54	21.68
Irrigation Storage	12.32	12.32	0	0	0	0
Limited Warmwater Fishery	1559.11	1315.13	0	196.8	3.69	43.49
Livestock Watering	6624.01	5913.21	0	138.39	572.41	0
Marginal Coldwater Fishery	894.67	495.93	0	347.08	8.17	43.49
Municipal Water Supply	911.73	818.96	0	0	92.77	0
Primary Contact	654.64	418.64	0	0	223.24	12.76
Secondary Contact	5542.07	4732.64	0	80.73	545.51	183.19
Warmwater Fishery	1192.02	755.29	0	409.33	27.4	0
Wildlife Habitat	6624.01	5710.54	0	64.68	838.35	10.44

Individual Use Support in the New Mexico's Lakes and Reservoirs

The State has identified 175 publicly owned, freshwater lakes totaling 148,883 acres. These waterbodies consist of large mainstem reservoirs, mountain cirque lakes and small fishing impoundments ranging in size from less than one acre to a 40,000-acre reservoir (Elephant Butte Reservoir at maximum storage pool). Regardless of size, all lakes are used extensively in water-scarce New Mexico. Even the smaller lakes provide drinking water for livestock watering and habitat for wildlife, are used by migratory waterfowl or provide important recreational opportunities for boating, swimming, fishing and aesthetic pleasure in municipal, rural, and wilderness settings.

Although all publicly owned waterbodies are considered important, NMED has prioritized lakes and reservoirs over twenty acres as "significant," due to their many uses. In addition, publicly owned high mountain cirque lakes, regardless of size, are also considered "significant" since they serve as sensitive indicators of potential acidic precipitation as well as nonpoint sources of pollution.

Assessed lakes, playas and reservoirs cover approximately 64,409 acres, or about 43%, of the estimated 148,883 publicly-owned lake acres. The State water quality standards apply to lakes and reservoirs as well as to streams. Every year, NMED conducts lake monitoring in conjunction with watershed stream surveys. Where available, data collected during the past five years are used to determine use attainment in lakes and reservoirs determined to be "significant" in New Mexico; this number includes a few additional lakes smaller than twenty acres where fish kills or pollutants have threatened designated use attainment. The remainder of the "significant" lakes were evaluated based on historical data or best professional judgment. The Integrated List (Appendix B) summarizes the State's assessment of the "significant" lakes.

Table 4.3 summarizes the overall level of use support in assessed lakes based on recent water quality data and/or observation of persistent conditions.

Table 4.3. Individual Use Support Summary for New Mexico Lakes/Reservoirs

Report for Water Type: LAKE/RESERVOIR/POND; Units: ACRES

USE	Total Size	Size Fully Supporting	Size Fully Supporting and Threat-ened	Size Not Supporting	Size Not Assessed	Size with Insufficient Info
Coldwater Fishery	26342.33	3556.91	0	22785.42	0	0
Domestic Water Supply	3043.47	2321.61	0	0	721.86	0
Fish Culture	2974.33	2350.7	0	11.16	612.47	0
High Quality Coldwater Fishery	2166.99	320.64	0	1390.86	455.49	0
Industrial Water Stor-age	13151.19	13151.19	0	0	0	0
Industrial Water Supply	5559.23	5442.7	0	0	116.53	0
Irrigation	8329.47	7563.42	0	0	766.05	0
Irrigation Storage	41803.64	41803.64	0	0	0	0
Limited Warmwater Fishery	1988.64	365.02	0	1617.57	6.05	0
Livestock Watering	78374.03	75050.78	0	1476.76	1846.49	0
Marginal Coldwater Fishery	300.21	11.79	0	62.94	225.48	0
Municipal Water Stor-age	13151.19	13151.19	0	0	0	0
Municipal Water Supply	6502.73	6493.23	0	0	9.5	0
Primary Contact	48857.52	48854.52	0	0	3	0
Secondary Contact	5889.45	5123.4	0	0	766.05	0
Warmwater Fishery	44178.64	2072.98	0	41641.26	352.51	111.89
Wildlife Habitat	82921.9	79198.65	0	1887.7	1835.55	0

The fishable goal of the CWA is defined as protection and propagation of fish, shellfish, and wildlife. Support for this use is reported under the various fishery uses in Table 4.3. The swimmable goal is defined as providing for recreation in and on the water. Support for this goal is reported under the primary and secondary contact uses. Support for the swimmable use is based on monitored levels of fecal coliform. Several lakes and reservoirs are on the most recent version of the New Mexico

Fish Consumption Guidelines due to the levels of mercury in fish tissue (NMDOH et al. 2001). This issue is discussed below under *Public Health/Aquatic Life Impacts*.

In previous 305(d) reports, these waters were as non-supporting associated fishery uses due to mercury in fish tissue. Since New Mexico does not have any water quality standards regarding mercury levels in fish tissues, inclusion on the fish consumption guidelines will be noted in the "Observed Effects" portion of ADB v.2 instead of an impairment of any particular designated use according to the new integrated listing methodology

Trophic Status

Trophic state is established as part of lake water quality monitoring efforts. Although trophic state is not used in New Mexico in use attainment determination, it is an important tool which helps relate the relative condition of a lake to its designated use support, and also leads to a better understanding of what probable cause or causes may be contributing to water quality problems within a lake.

Trophic states were evaluated using the Carlson trophic state indices (TSIs). The lakes were categorized using a continuum from oligotrophy to eutrophy. The univariate Carlson index used to assess trophic state is based on Secchi disk depth, chlorophyll *a* and total phosphorus concentrations. It is an absolute index whereby a ten-unit increase on a scale of zero to 100 corresponds to a doubling in epilimnetic algal biomass. Thus, small differences in data values result in a larger change in TSI for lake trophic evaluation.

Each of the Carlson TSI values for a given lake has been separately evaluated with preferential consideration given to chlorophyll concentrations. Trophic state boundaries are consistent with the EPA index: i.e., trophic state values exceeding 47 indicate a eutrophic lake and values less than 42 indicate oligotrophic lakes (USEPA 1974, USEPA 1979). These trophic state indices were evaluated for their applicability in comparisons between the various playa lakes under investigation throughout

New Mexico. The investigators concluded that these indices have little to no applicability or usefulness in comparisons between hypersaline lakes. Furthermore, since these trophic state indices were developed using data from temperate freshwater lakes, their applicability to most playa lake environments may be limited.

Classification systems simplify the dynamic concept of trophic state. Among the assumptions of the classification indices are that algae are the most important primary producers and nutrient loading is responsible for the productivity within the lake (USEPA 1974, USEPA 1979). The Carlson index is of limited applicability for lakes with significant non-algal turbidity or nitrogen limitation, where aquatic macrophytes are the dominant primary producers, or where zooplankton grazing controls algal abundance. The biological data and total nitrogen/total phosphorus ratios for each lake are also used to help evaluate the utility of the trophic index for classifying lakes in New Mexico. Table 4.4 displays the total number of evaluated lakes in each trophic class.

Table 4.4. Tropic Status of New Mexico Lakes and Reservoirs

Trophic Class	Number of evaluated lakes/reservoirs
Eutrophic	33
Oligomesotrophic	8
Mesoeutrophic	7
Oligotrophic	0
Mesotrophic	12
Dystrophic	1

Trophic state for evaluated lakes and general morphometric data for most of the publicly owned lakes in New Mexico are can be found in Table ** of Appendix B.

Lake Acidification

No lakes in New Mexico are known to consistently have pH values less than 5.0 standard units; therefore, there is no current need to develop methods to neutralize or restore buffering capacity. Lakes most likely to be susceptible to acid precipitation are characterized by alkalinities less than less than 5-10 mg $CaCO_3$/L, have small watersheds, and are located on granitic bedrock at high elevations. Data from fourteen such publicly-owned lakes were collected by Lynch *et al.* (Carlson 1989). Results of this study indicated that, based on the characteristics listed above, the Truchas Lakes and Santa Fe Lake are potentially the most susceptible of those reviewed to acidification due to low buffering capacity. Further data for these and other alpine lakes are needed to establish acidification trends in any high-elevation lake in New Mexico.

The high-elevation cirque lakes in New Mexico are all contained within National Forests boundaries. The United States Forest Service (USFS) has developed a monitoring plan to perform tracer studies to identify the sources of possible acid precipitation falling in the State's major high-mountain areas.

Control Methods

Programs and measures to control potential pollution sources to New Mexico's lakes include the federal National Pollutant Discharge Elimination System (NPDES) program for point source discharges and the State certification process for permits issued under this program; State certification of federal dredge-and-fill permits (CWA Section 401); discharge plans required under the State ground water regulations; State review of federal actions under the consistency provisions of the federal Clean Water Act; and agreements between NMED and other State and federal agencies to implement nonpoint source pollution control measures.

Impairment Category Determinations for Integrated §303(d)/305(b) List

The determination of use support using established assessment protocols are then combined to determine the overall water quality standard attainment category for each AU (USEPA 2001). The unique assessment categories for New Mexico are described as follows (see also Figure 4.1):

1. ***Attaining the water quality standards for all designated and existing uses*. AUs are listed in this category if there are data and information that meet all requirements of the assessment and listing methodology and support a determination that the water quality criteria are attained.**

2. ***Attaining some of the designated or existing uses based on numeric and narrative parameters that were tested, and no reliable monitored data is available to determine if the remaining uses are attained or threatened.* AUs are listed in this category if there are data and information that meet requirements of the assessment and listing methodology to support a determination that some, but not all, uses are attained based on numeric and narrative water quality criteria that were tested. Attainment status of the remaining uses is unknown because there is no reliable monitored data with which to make a determination.**

3. ***No reliable monitored data and/or information to determine if any designated or existing use is attained.* AUs are listed in this category where data to support an attainment determination for any use are not available, consistent with requirements of the assessment and listing methodology.**

4. ***Impaired for one or more designated uses, but does not require development of a TMDL be-***

cause:

A. *TMDL has been completed*. AUs are listed in this subcategory once all TMDL(s) have been developed and approved by USEPA that, when implemented, are expected to result in full attainment of the standard. Where more than one pollutant is associated with the impairment of an AU, the AU remains in Category 5A (see below) until all TMDLs for each pollutant have been completed and approved by USEPA.

B. *Other pollution control requirements are reasonably expected to result in attainment of the water quality standard in the near future.* Consistent with the regulation under 130.7(b)(i),(ii), and (iii), AUs are listed in this subcategory where other pollution control requirements required by local, state, or federal authority are stringent enough to implement any water quality standard (WQS) applicable to such waters.

C. *Impairment is not caused by a pollutant*. AUs are listed in this subcategory if a pollutant does not cause the impairment. For example, USEPA considers flow alteration to be "pollution" vs. a "pollutant."

5. *Impaired for one or more designated or existing uses*. The AU is not supporting one or more of its designated uses because one or more water quality standards are not attained according to current water quality standards and assessment methodologies. This category constitutes the CWA §303(d) List of Impaired Waters. In order to relay additional information to stakeholders including SWQB staff, Category 5 is further broken down into the following categories:

A. *A TMDL is underway or scheduled*. AUs are listed in this category if the AU is impaired for one or more designated uses by a pollutant. Where more than one pollutant is associated with the impairment of a single AU, the AU remains in Category 5A until

TMDLs for all pollutants have been completed and approved by USEPA.

B. ***A review of the water quality standard will be conducted.*** **AUs are listed in this category when it is possible that water quality standards are not being met because one or more current designated use is inappropriate. After a review of the water quality standard is conducted, a Use Attainability Analysis (UAA) will be developed and submitted to USEPA for consideration, or the AU will be moved to Category 5A and a TMDL will be scheduled.**

C. ***Additional data will be collected before a TMDL is scheduled.*** **AUs are listed in this category if there is not enough data to determine the pollutant of concern or there is not adequate data to develop a TMDL. For example, AUs with biological impairment will be listed in this category until further research can determine the particular pollutant(s) of concern. When the pollutant(s) are determined, the AU will be moved to Category 5A and a TMDL will be scheduled. If it is determined that the current designated uses are inappropriate, it will be moved to Category 5B and a UAA will be developed. If it is determined that "pollution" is causing the impairment (vs. a "pollutant"), the AU will be moved to Category 4C.**

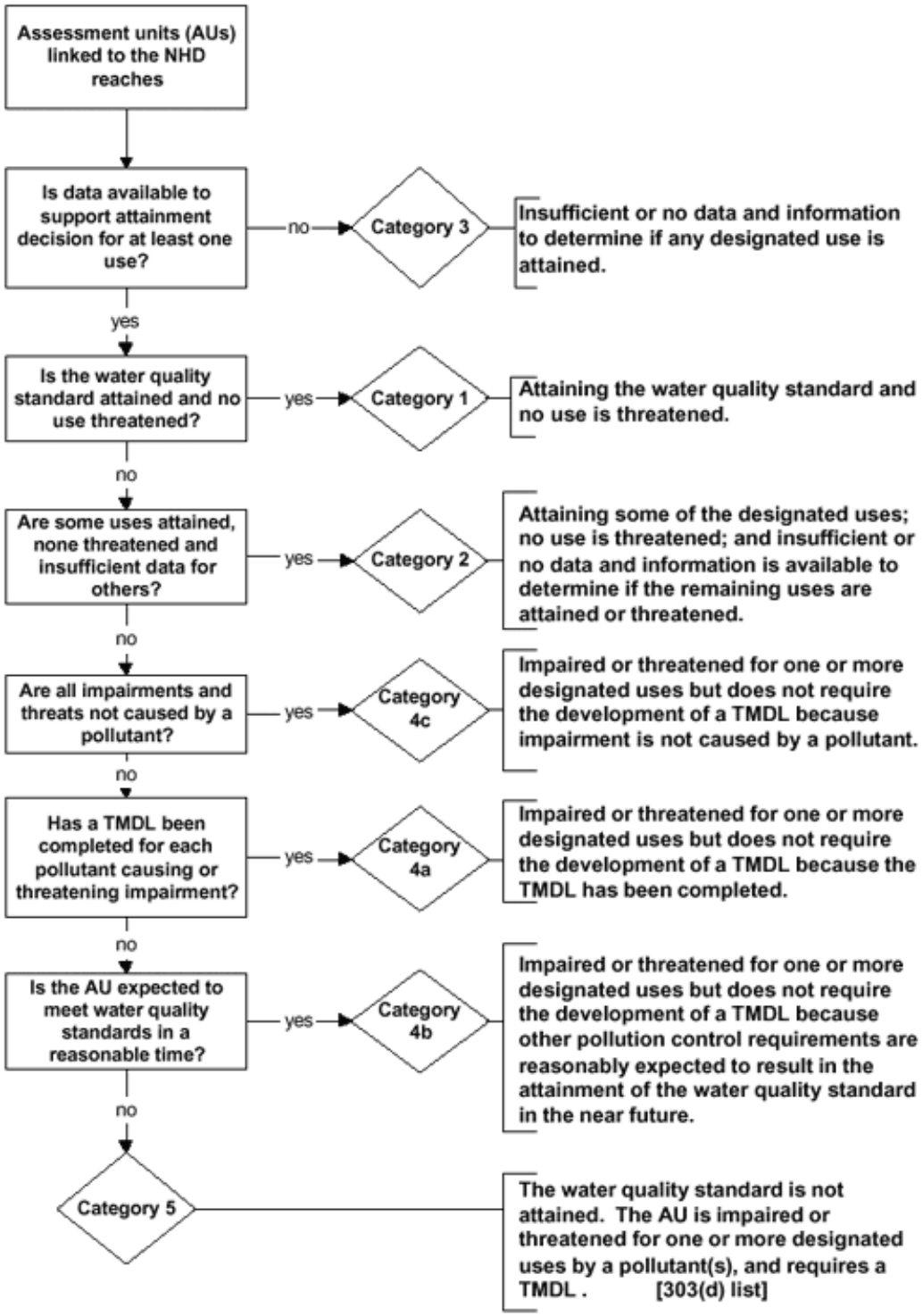

Figure 4.1. Generalized summary of logic for attainment categories (USEPA 2001).
NOTE: Category 5 was further expanded into categories 5A, 5B, and 5C.

This change in reporting was developed in response to a recent National Research Council (NRC) report and a desire to provide a clearer summary of the nation's water quality status and management actions necessary to protect and restore them (NRC 2001, USEPA 2001). With a few additions and minor changes in terminology, the information requested in the *Integrated Listing* guidance (USEPA 2001) and CALM guidance (USEPA 2002) were previously suggested in earlier 305(b) reporting guidance (USEPA 1997). The earlier guidance formed the basis of previous SWQB assessment protocols.

Assessment information is housed in ADB v.2 (RTI 2002). This database was designed to help states implement suggestions in the Integrated Listing guidance (USEPA 2001). The database is first populated with AU information, associated designated uses, comments, and any supporting documentation. Individual designated use attainment decisions (i.e., Full Support, Non Support, Not Assessed) are then entered for each AU. ADB v.2 then automatically determines the water quality standards attainment category for each AU based on the information entered for each applicable designated use.

CAUSES AND SOURCES OF WATER QUALITY IMPAIRMENT

Causes of Surface Water Quality Impairment

Table 4.5 presents an analysis of the causes of impairment in the State's streams. Stream bottom deposits (sedimentation/siltation), temperature, and turbidity are the major causes of impairment of designated or attainable uses based on current water quality standards. Aluminum is also a primary cause based on the current chronic criterion of 0.87 ug/L. It is believed that this criterion is not achievable in many areas of the state where aluminum is naturally occurring. This issue will be addressed in upcoming triennial reviews.

Table 4.6 presents an analysis of the analysis of the causes of impairment in the State's lakes and reservoirs. Siltation, nutrients and nuisance algae are the major casual agents of use impairment.

As noted above, mercury in fish tissue is now listed as an Observed Effect instead of an impairment because New Mexico currently does not have any water quality standards related to mercury levels in fish.

Table 4.5. Summary of Causes of Impairment in Streams/Rivers [a,b] **WILL BE UPDATED

Report for Water Type: STREAM/CREEK/RIVER; Units: MILES

Impairment	Total Size
PATHOGENS	**360.62**
Total Fecal Coliform	**360.62**
BIOLOGIC INTEGRITY (BIOASSESSMENTS)	**219.28**
Benthic-Macroinvertebrate Bioassessments (Streams)	**63.83**
Nutrient/Eutrophication Biological Indicators	**155.45**
OXYGEN DEPLETION	**330.61**
Oxygen, Dissolved	**330.61**
THERMAL IMPACTS	**1073.13**
Temperature, water	**1073.13**
NUTRIENTS (Macronutrients/Growth Factors)	**185.57**
Ammonia (Unionized) – Toxin	**30.12**
Nutrient/Eutrophication Biological Indicators	**155.45**
TOXIC INORGANICS	**681.83**
Aluminum	**525.42**
Ammonia (Unionized) – Toxin	**30.12**
Cadmium	**5.76**
Chlorine	**17.56**
Mercury	**17.56**
Selenium	**79.65**
Zinc	**5.76**
TOXIC ORGANICS	**6.17**
Polychlorinated biphenyls	**6.17**
METALS	**634.15**
Aluminum	**525.42**
Cadmium	**5.76**
Mercury	**17.56**
Selenium	**79.65**
Zinc	**5.76**
MINERALIZATION	**77.65**
Total Dissolved Solids	**77.65**
pH/ACIDITY/CAUSTIC CONDITIONS	**172.32**
Chlorine	**17.56**
pH	**154.76**
RADIATION	**60.82**
Gross Alpha	**60.82**
SEDIMENTATION	**1373.16**
Sedimentation/Siltation	**1373.16**
OTHER	**46**
Impairment Unknown	**46**

[a] This information was generated using the USEPA's *ADB* software.
[b] In most instances, more than one causal agent contributed to water quality impairment. Where waterbodies have more than one cause of impairment, the appropriate waterbody length was entered in each category.

Table 4.6. Summary of Causes of Impairment in Lakes/Reservoirs [a,b] **WILL BE UPDATED

Report for Water Type: LAKE/RESERVOIR/POND; Units: ACRES

Impairment	Total Size
BIOLOGIC INTEGRITY (BIOASSESSMENTS)	4561.11
Nutrient/Eutrophication Biological Indicators	4561.11
BIOASSAYS	1854.76
Sediment Bioassays -- Chronic Toxicity -- Freshwater	1854.76
OXYGEN DEPLETION	22.96
Oxygen, Dissolved	22.96
THERMAL IMPACTS	68.37
Temperature, water	68.37
NUTRIENTS (Macronutrients/Growth Factors)	4561.11
Nutrient/Eutrophication Biological Indicators	4561.11
TOXIC INORGANICS	22.32
Copper	22.32
METALS	22.32
Copper	22.32
pH/ACIDITY/CAUSTIC CONDITIONS	90.25
pH	90.25
SEDIMENTATION	274.57
Sedimentation/Siltation	274.57

[a] This information was generated using the USEPA's *ADB* software.
[b] In most instances, more than one causal agent contributed to water quality impairment. Where waterbodies have more than one cause of impairment, the appropriate waterbody length was entered in each category.

Sources of Surface Water Quality Impairment

Point source discharges now play a quantitatively minor role in the impairment of the State's streams (Figure 4.2). Over 95% of all water quality impairment identified in New Mexico's streams

is due to nonpoint sources of water pollution.

While poorly operated or maintained treatment plants may have severe adverse localized effects on water quality, the available data indicate the State, working with EPA and permitees, has been largely successful in reducing point source impacts on the State's surface waters.

~~As data are collected during new surveys, samples will be collected for metals seven or eight times throughout the year. All future changes to the listings for chronic standards violations should be based on results of 7 or 8 samples. Until adequate data exist for evaluating use support based on multiple samples, the number of miles of impairment due to chronic violations should be assumed to be artificially high. Significant data for such studies are currently being collected.~~

~~It should be noted that many of New Mexico's streams and lakes have not been sampled by any agency within the last seven water years (October 1994-September 2001). Data limitations reported in the State's last reports to the United States Congress still exist (**3**, **4**, **5, 6**).~~

~~During the current CWA §305(b) reporting cycle, special three-season intensive water quality surveys were completed on 3-4 watersheds and 3-4 lakes each year. These special surveys are listed in Table 13 below.~~

~~Also during the current biennial reporting period (2000-2002), geographic and water quality assessment data for the majority of New Mexico's perennial rivers and streams have been entered into the latest Microsoft® application (version 1.0.3) of EPA's Access® Database (ADB) software. The ADB allows for more detailed reporting of the overall health of a waterbody, the number of miles affected by various pollutants, and the extent of designated use support. The information in the database was used to provide many of the tabulations in this report. Because of more detailed tracking, the miles of streams with impaired uses may vary from previous reports.~~

~~Stream Water Quality~~

~~Appendix B summarizes, on a segment-by-segment basis, those rivers and streams with designated~~

uses which are either fully supported-impacts observed, partially supported or which are not supported due to man-made or man-induced point or nonpoint source pollution. In the case of several waters not currently assigned designated uses in the State's water quality standards, existing or attainable uses which are impaired are identified. Appendix B also identifies the impaired reach of the stream or river and the probable causes and sources of use nonattainment. Appendix B identifies the codes for sources of nonsupport.

Approximately 2,744 assessed river miles have impaired designated existing or attainable uses and 489 miles out of a total of 6,590 State-recognized perennial river miles are threatened with impairment. Many of the identified reaches have more than a single threatened or impaired use. Use impairment is frequently due to several causal agents from several sources. One hundred and forty-nine streams and 212 impaired reaches of these streams are distributed among 42 of the 69 segments described in the State's water quality standards. Stream reaches with impaired uses have been identified in all of New Mexico's water quality basins. This compares with the 2,675 impaired river miles in 179 rivers or streams composed of 223 reaches in the last report to Congress.

Aquatic Life Use Support in the State's Streams

Table 4 summarizes the aquatic life level of use support in those streams which have been assessed. Over 2,743.68 stream miles were found to have been adversely affected to the extent that designated or attainable uses were only partially supported. Nine streams were found to be affected to the extent that designated uses were not supported.Almost 2,980 miles of New Mexico's waters have been assessed and determined to fully support all designated uses. The majority of these waters are in wilderness areas or in watersheds protected from anthropogenic impacts. As evaluation of water quality continues, additional waters may be identified which fully support designated uses; these will be tabulated in future reports.

Individual Use Support in the State's Streams

Table 5 is a summary of individual designated use support. The Clean Water Act goal of "fishable" is now reported under the fish consumption and aquatic life support uses, and the "swimmable" goal is re-

ported under the swimmable and secondary contact uses. EPA developed this method through a consensus approach to reduce inconsistencies in states' reports. Table 5 was generated using the ADB database.

Overall, 7 of the State's 15 designated uses have been impaired by point or nonpoint sources of pollutants. All subcategories of coldwater fishery along with warmwater fishery uses, as well as the irrigation and irrigation storage, secondary contact, and livestock watering uses have been impaired.

The majority of assessed river miles at least partially meets the fish consumption and aquatic life support goal of the Clean Water Act.Approximately 396 miles of stream reaches were added to the impaired status list from *fully supporting* designated uses. From these, almost 333 miles of stream reaches were changed directly to *not supporting* status while just over 50 miles of *fully supporting – impacts observed* reaches were reclassified as *partially supporting* their designated uses. Incidentally, almost 50 miles of reaches previously designated as *not supporting* have improved to *partially supported* status. Nearly 34 miles previouslylisted as not supporting their designated uses were restored to *fully supported* status and removed altogether from the list. The changes in status were the result of improved monitoring techniques associated with the new TMDL Program.

Table 4. Aquatic Life Use Support in Assessed Streams

(Size unit in miles)

	Assessment Basis		
Degree of Use Support	**Evaluated**	**Monitored**	**Total Assessed**
Fully Supporting	2,478.18	501.23	2,979.41
Fully Supporting, Impacts Observed	268.49	220.83	489.32
Partial and Not Supporting	1,047.43	1,696.25	2,743.68
Total Size Assessed	**3,794.10**	**2,418.31**	**6,212.41**

Table 5. Individual Use Support Summary for New Mexico Streams

(Size unit in miles)

Use	Fully Supporting	Fully Supporting Impacts Observed	Partially Supporting	Not Supporting	Size Assessed
High Quality Cold Fishery	648.00	158.90	403.31	945.99	2,156.20
Coldwater Fishery	287.11	43.19	234.69	383.12	948.11
Marginal Coldwater Fishery	407.53	130.9	243.10	110.56	892.09
Warmwater Fishery	612.63	91.70	331.04	231.95	1,267.32
Limited Warmwater Fishery	1,148.14	188.77	224.71	0.00	1,561.62
Primary Contact	255.98	236.34	0.00	0.00	492.32
Secondary Contact	4,418.42	948.91	58.99	24.79	5,451.11
Domestic Water Supply	1,575.67	617.81	5.77	0.00	2,199.25
Fish Culture	1,370.99	433.75	3.40	0.00	1,808.14
Irrigation	4,476.97	1,152.11	79.98	77.02	5,786.08
Livestock Watering	4,921.62	1,176.27	18.84	64.52	6,181.25
Wildlife Habitat	4,966.39	1,209.09	14.94	0.00	6,190.42

Lake Water Quality

The State has identified 175 publicly owned, freshwater lakes totaling 148,883 acres. These waterbodies consist of large mainstem reservoirs, mountain cirque lakes and small fishing impoundments ranging in size from less than one acre to a 40,000-acre reservoir (Elephant Butte Reservoir at maximum storage pool). Regardless of size, all lakes are used extensively in water-scarce New Mexico. Even the smaller lakes provide drinking water for livestock watering and habitat for wildlife, are used by migratory waterfowl or provide important recreational opportunities for boating, swimming, fishing and aesthetic pleasure in municipal, rural, and wilderness settings (Appendix B, Table 18).

Although all publicly owned waterbodies are considered important, NMED has prioritized lakes and reservoirs over twenty acres as "significant," due to their many uses. In addition, publicly owned high mountain cirque lakes, regardless of size, are also considered "significant" since they serve as sensitive indicators of potential acidic precipitation as well as nonpoint sources of pollution.

Attainment of Designated Uses and Clean Water Act Goals

Assessed lakes, playas and reservoirs cover approximately 64,409 acres, or about 43%, of the estimated 148,883 publicly-owned lake acres. The State water quality standards apply to lakes and reservoirs as well as to streams. During 2000-2001, NMED conducted lake monitoring in conjunction with watershed surveys. Where available, data collected during the past five years (1996-2001), were used to determine use attainment in lakes and reservoirs determined to be "significant" in New Mexico; this number includes a few additional lakes smaller than twenty acres where fish kills or pollutants have threatened designated use attainment. The remainder of the "significant" lakes were evaluated based on historical data or best professional judgment. Monitoring data were used to assess 15,958 lake acres (25% of assessed lake acres) while 48,451 acres (75%) were evaluated.

Appendix B summarizes the State's assessment of the "significant" lakes with less than full support

for designated or attainable uses. The table also identifies lakes whose status of support is unknown due to paucity or age of data. This table identifies:

- thirty-five lakes and playas which currently fully support designated uses but with impacts observed which could adversely affect favorable status conditions should current trends continue;
- thirty-one lakes and playas which partially support designated uses;
- nine lakes and playas where use support is unknown due to the paucity of recent monitoring data or other information which would permit an updated evaluation; and
- seven lakes and playas in which at least one designated use is not supported.

A total of 60,400 lake and playa acres do not fully support designated uses; this is a decrease in the number of lake acres identified as impaired in 2000 (6).

Table 6 summarizes the overall level of use support in assessed lakes. Almost all impaired lake acreage falls under the categories of partially supported or fully supported/impacts observed. Based on recent water quality data and/or observation of persistent conditions, 1,960 lake and playas acres are assessed as partially supporting or not supporting one or more designated use. Causes of nonsupport include nutrients, siltation, reduction of riparian vegetation, and bank destabilization resulting primarily from agriculture and recreation.

Table 7 summarizes the status of support for designated uses and for the so-called fishable/swimmable goals of the federal Clean Water Act.

The fishable goal of the CWA is defined as protection and propagation of fish, shellfish, and wildlife. Support for this use is reported under the various fishery uses in Table 7. Most of the assessed lake acres either do not or only partially support the fishery uses due to the levels of mercury in fish tissue (a "presumed" use of fish consumption); this issue is discussed below under ***Public Health/Aquatic Life Impacts***.

All classified lake and playa acreages are also designated for wildlife habitat and livestock watering uses.

The swimmable goal is defined as providing for recreation in and on the water. Support for this goal is reported under the primary and secondary contact uses. Support for the swimmable use is based on swimming area closures. There has been a closure on Burn Lake in Las Cruces due to excessive pathogens. No other closures have been issued during this period.

Support assessment for all of the State's designated uses are based on Appendix B. Impaired lake acreage is due solely to nonpoint sources of pollution. Table 7 shows that nine designated uses in New Mexico's lakes have been adversely affected by these sources. All subcategories of fisheries are partially impaired or fully supporting but with impacts observed. Rooted macrophytes, algal growth and turbidity have adversely affected secondary contact recreation. The only uses not impaired are primary contact recreation, domestic water supply, irrigation and irrigation storage.

Trophic Status

Trophic state is established as part of lake water quality monitoring efforts. Although trophic state is not used in New Mexico in use attainment determination, it is an important tool which helps relate the relative condition of a lake to its designated use support, and also leads to a better understanding of what probable cause or causes may be contributing to water quality problems within a lake.

Trophic states were evaluated using the Carlson trophic state indices (TSIs). The lakes were categorized using a continuum from oligotrophy to eutrophy. The univariate Carlson index used to assess trophic state is based on Secchi disk depth, chlorophyll *a* and total phosphorus concentrations. It is an absolute index whereby a ten-unit increase on a scale of zero to 100 corresponds to a doubling in epilimnetic algal biomass. Thus, small differences in data values result in a larger change in TSI for lake trophic evaluation.

Table 6. Aquatic Life Use Support in Assessed Lakes

(Size units in acres)

	Assessment Basis				
Degree of Use Support	**Evaluated**		**Monitored**		**Total Assessed**
Size fully supporting	2,506.44	(63%)	1,491.82	(37%)	3,998.26
Size fully supporting, impacts observed	10.94	(100%)	0.00	(0%)	10.94
Size partial and not supporting	45,933.60	(76%)	14,465.88	(24%)	60,399.48
TOTAL	**48,450.98**	**(75%)**	**15,957.70**	**(25%)**	**64,408.68**

Table 7. Individual Use Support in New Mexico Lakes
(Size units in acres)

Use	Assessed				Size Assessed
	Supporting	Supporting Impacts Observed	Partially Supporting	Not Supporting	
New Mexico Designated Uses					
High quality coldwater fishery	321.17	0.00	0.00	1,390.41	1,711.58
Coldwater fishery	3,557.13	0.00	68.37	22,717.07	26,342.57
Marginal coldwater fishery	11.79	10.94	0.00	52.00	74.43
Warmwater fishery	2,174.37	10.94	0.00	41,641.30	43,826.19
Limited warmwater fishery	353.44		0.00	1,629.16	1,982.60
Primary contact recreation	48,854.78	0.00	0.00	0.00	48,854.78
Secondary contact recreation	5,112.56	10.94	0.00	0.00	5,123.50
Domestic water supply	2,321.69	0.00	0.00	0.00	2,321.69
Fish culture	2,605.96	0.00	0.00	34.98	2,361.92
Livestock watering	68,861.05	0.00	0.00	1,476.76	52,076.10
Wildlife Habitat	73,504.59	10.94	5,694.47	1,876.76	81,086.76
Irrigation	7,563.7	0.00	0.00	0.00	7,563.70
Irrigation Storage	41,803.68	0.00	0.00	0.00	41,803.68

~~Each of the Carlson TSI values for a given lake has been separately evaluated with preferential consideration given to chlorophyll concentrations. Trophic state boundaries are consistent with the EPA index: i.e., trophic state values exceeding 47 indicate a eutrophic lake and values less than 42 indicate oligotrophic lakes (**7, 8**). These trophic state indices were evaluated for their applicability in comparisons between the various playa lakes under investigation throughout New Mexico. The investigators concluded that these indices have little to no applicability or usefulness in comparisons between hypersaline lakes. Furthermore, since these trophic state indices were developed using data from temperate freshwater lakes, their applicability to most playa lake environments may be limited.~~

~~Classification systems simplify the dynamic concept of trophic state. Among the assumptions of the classification indices are that algae are the most important primary producers and nutrient loading is responsible for the productivity within the lake (**8, 9**). The Carlson index is of limited applicability for lakes with significant non-algal turbidity or nitrogen limitation, where aquatic macrophytes are the dominant primary producers, or where zooplankton grazing controls algal abundance. The biological data and total nitrogen/total phosphorus ratios for each lake are also used to help evaluate the utility of the trophic index for classifying lakes in New Mexico.~~

~~The total number of evaluated lakes in each trophic class is:~~

~~Eutrophic 33~~

~~Oligomesotrophic 8~~

~~Mesoeutrophic7~~

~~Oligotrophic 0~~

~~Mesotrophic 12~~

~~Dystrophic 1~~

Trophic state for evaluated lakes and general morphometric data for most of the publicly owned lakes in New Mexico are can be found in Appendix B.

Lake Acidification

No lakes in New Mexico are known to consistently have pH values less than 5.0 standard units; therefore, there is no current need to develop methods to neutralize or restore buffering capacity. Lakes most likely to be susceptible to acid precipitation are characterized by alkalinities less than 100-200 μeq/L (less than 5-10 mg $CaCO_3$/L), have small watersheds, and are located on granitic bedrock at high elevations. Data from 14 such publicly-owned lakes were collected by Lynch *et al*. (**10**). Results of this study indicated that, based on the characteristics listed above, the Truchas Lakes and Santa Fe Lake are potentially the most susceptible of those reviewed to acidification due to low buffering capacity. Further data for these and other alpine lakes are needed to establish acidification trends in any high-elevation lake in New Mexico.

The high-elevation cirque lakes in New Mexico are all contained within National Forests boundaries. The United States Forest Service (USFS) has developed a monitoring plan to perform tracer studies to identify the sources of possible acid precipitation falling in the State's major high-mountain areas.

Control Methods

Programs and measures to control potential pollution sources to New Mexico's lakes include the federal National Pollutant Discharge Elimination System (NPDES) program for point source discharges and the State certification process for permits issued under this program; State certification of federal dredge-and-fill permits; discharge plans required under the State ground water regulations; State review of federal actions under the consistency provisions of the federal Clean Water Act; and agreements between NMED and other State and federal agencies to implement nonpoint source pollution control measures.

CAUSES AND SOURCES OF WATER QUALITY IMPAIRMENT

Streams

Table 8 presents an analysis of those causal agents which have seriously affected the State's streams.

~~Heavy metal contamination, stream bottom deposits, temperature, total organic carbon and turbidity are the major causes of impairment of designated or attainable uses.~~

~~Point source discharges now play a quantitatively minor role in the impairment of the State's streams (Figure **5**). Over 91% of all water quality impairment identified in New Mexico's streams is due to non-point sources of water pollution.~~

~~While poorly operated or maintained treatment plants may have severe adverse localized effects on water quality, the available data indicate the State, working with EPA and permitees, has been largely successful in reducing point source impacts on the State's surface waters.~~

~~Approximately 190 stream miles are impaired largely due to discharges from wastewater treatment plants (Table 9). The majority of the remaining stream miles are impaired by nonpoint sources of pollution. Figure 6 identifies the major nonpoint sources of impairment in the State's streams. The chart shows that water quality impairment due to agriculture and range land grazing affects about 27% of the State's streams. Although no "hard" data exist, wildlife grazing may also contribute to localized water quality problems.~~

~~Hydromodification impairments affecting over 43% of New Mexico streams occur from dam reconstruction activities, stream channelization, or flow diversion for irrigation.~~

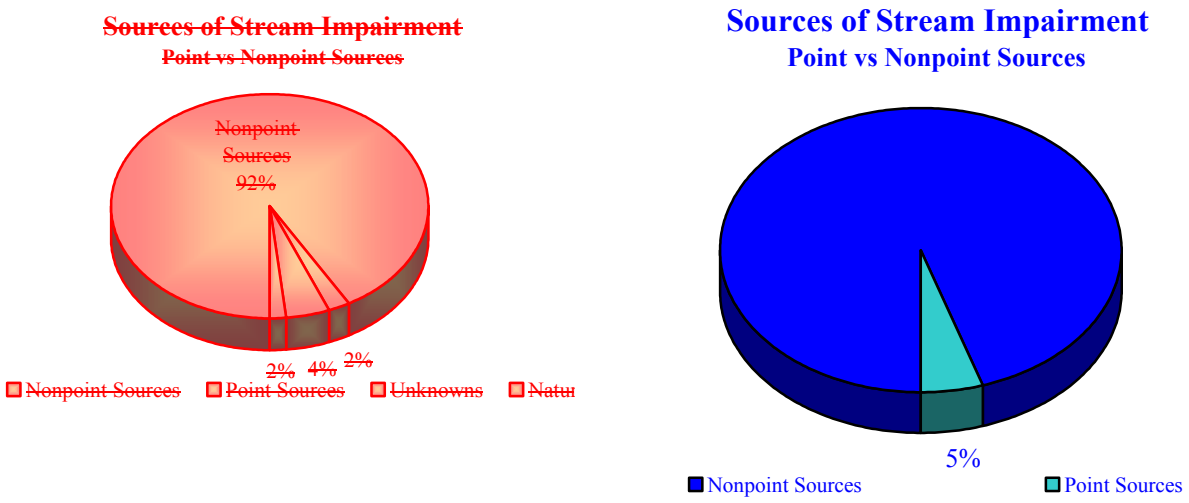

Figure 54.2. Sources of Impairment to New Mexico's Streams.

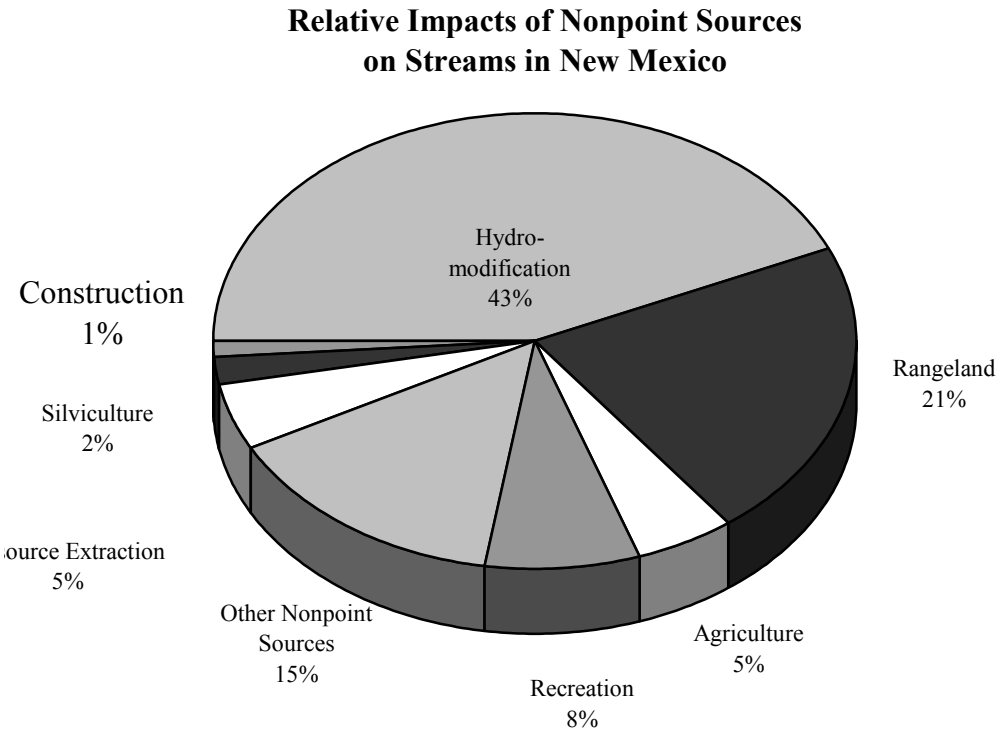

Figure 64.3. Major Nonpoint Sources of Pollution in New Mexico's Streams.

Table 4.7 presents an analysis of the probable sources of impairment in the State's streams. The majority of the remaining stream miles are impaired by nonpoint sources of pollution. Figure 4.3 identifies the major nonpoint sources of impairment in the State's streams. Livestock grazing, habitat alteration, hydromodification, and runoff related to road construction and maintenance are the leading probable sources of impairment. Although no "hard" data exist, wildlife grazing (particularly by elk) is known to also contribute to localized water quality problems in certain areas of the state.

Table 4.7. Summary of Probable Sources of Impairment in Streams/Rivers [a,b] **WILL BE UPDATED

Report for Water Type: STREAM/CREEK/RIVER; Units: MILES

Source	Total Size
AGRICULTURE-ANIMAL FEEDING/HANDLING OPERATIONS (NPS - NOT REGULATED)	74.49
Animal Feeding Operations (NPS)	50.66
Aquaculture (Permitted)	14.63
Permitted Runoff from Confined Animal Feeding Operations (CAFOs)	9.2
AGRICULTURE-CROP PRODUCTION	446.54
Irrigated Crop Production	446.54
AGRICULTURE-GRAZING-RELATED SOURCES	2880.62
Rangeland (Unmanaged Pasture) Grazing	2823
Livestock (Grazing or Feeding Operations)	57.62
CONSTRUCTION	218.32
Highways, Roads, Bridges, Infrastructure (New Construction)	14.9
Site Clearance (Land Development or Redevelopment)	176.62
Low Water Crossing	26.8
HABITAT ALTERATIONS (NOT DIRECTLY RELATED TO HYDROMODIFICATION)	3856.24
Channelization	198.96
Dam Construction (Other than Upstream Flood Control Projects)	16.2
Dredging (e.g., for Navigation Channels)	44.31
Loss of Riparian Habitat	1941.23
Streambank Modifications/destabilization	1626.65
Upstream Impoundments (e.g., Pl-566 NRCS Structures)	24.29
Habitat Modification - other than Hydromodification	4.6
HYDROMODIFICATION	1526.21
Channelization	198.96
Dam Construction (Other than Upstream Flood Control Projects)	16.2
Dredging (E.g., for Navigation Channels)	44.31
Flow Alterations from Water Diversions	455.44
Highway/Road/Bridge Runoff (Non-construction Related)	787.01
Upstream Impoundments (e.g., Pl-566 NRCS Structures)	24.29
INDUSTRIAL PERMITTED DISCHARGES	285.99
Industrial Point Source Discharge	39.32
Industrial/Commercial Site Stormwater Discharge (Permitted	66.35
Petroleum/natural Gas Production Activities (Permitted)	180.32
LAND APPLICATION/WASTE SITES	411.94
On-site Treatment Systems (Septic Systems and Similar Decencentralized Systems)	301.04
Septage Disposal	62.41
Inappropriate Waste Disposal	48.49
LEGACY/HISTORICAL POLLUTANTS	494.61
Acid Mine Drainage	16.64
Dredging (E.g., for Navigation Channels)	44.31
Impacts from Abandoned Mine Lands (Inactive)	164.29
Mill Tailings	108.15
Mine Tailings	161.22

MUNICIPAL PERMITTED DISCHARGES (DIRECT AND INDIRECT)	**737.68**
Municipal (Urbanized High Density Area)	275.7
Municipal Point Source Discharges	332.21
Post-development Erosion and Sedimentation	129.77
STORMWATER PERMITTED DISCHARGES (DIRECT AND INDIRECT)	**1630.67**
Highway/Road/Bridge Runoff (Non-construction Related)	787.01
Highways, Roads, Bridges, Infrastructure (New Construction)	14.9
Industrial/Commercial Site Stormwater Discharge (Permitted)	66.35
Municipal (Urbanized High Density Area)	275.7
Petroleum/natural Gas Production Activities (Permitted)	180.32
Post-development Erosion and Sedimentation	129.77
Site Clearance (Land Development or Redevelopment)	176.62
NATURAL	**1236.89**
Wildlife Other than Waterfowl	57.09
Natural Sources	1179.8
RECREATION AND TOURISM (NON-BOATING)	**813.06**
Off-road Vehicles	109.41
Other Recreational Pollution Sources	676.85
Low Water Crossing	26.8
RESOURCE EXTRACTION	**631.99**
Impacts from Abandoned Mine Lands (Inactive)	164.29
Mill Tailings	108.15
Mine Tailings	161.22
Placer Mining	5.5
Subsurface (Hardrock) Mining	4.89
Surface Mining	165.66
Reclamation of Inactive Mining	22.28
SILVICULTURE-LARGE-SCALE (INDUSTRIAL) FORESTRY	**872.48**
Forest Roads (Road Construction and Use)	185.99
Silviculture Harvesting	102.72
Siliviculture, Fire Suppression	284.8
Watershed Runoff following Forest Fire	298.97
SILVICULTURE-NON-INDUSTRIAL FORESTRY (WOODLOTS)	**583.77**
Siliviculture, Fire Suppression	284.8
Watershed Runoff following Forest Fire	298.97
SPILLS AND UNPERMITTED DISCHARGES	**110.9**
Septage Disposal	62.41
Inappropriate Waste Disposal	48.49
URBAN-RELATED RUNOFF/STORMWATER (OTHER THAN REGULATED DISCHARGES)	**1468.85**
Highway/Road/Bridge Runoff (Non-construction Related)	787.01
Highways, Roads, Bridges, Infrastructure (New Construction)	14.9
Industrial/Commercial Site Stormwater Discharge (Permitted)	66.35
Municipal (Urbanized High Density Area)	275.7
Post-development Erosion and Sedimentation	129.77
Site Clearance (Land Development or Redevelopment)	176.62
Impervious Surface/Parking Lot Runoff	18.5
OTHER	**2153.23**
Source Unknown	358.26
Natural Sources	1179.8
Habitat Modification - other than Hydromodification	4.6
Siliviculture, Fire Suppression	284.8
Watershed Runoff following Forest Fire	298.97
Low Water Crossing	26.8

[a] This information is generated using the USEPA's *ADB* software.

[b] In most instances, more than a single source contributed to water quality impairment. Where waterbodies have more than one source of impairment, the appropriate waterbody length is entered in each category.

Grazing and habitat alteration are the predominant sources of lake water quality impairment (Table 4.8). Point sources are not a significant factor in attainment of designated uses in the State's lakes.

Table 4.8. Summary of Probable Sources of Impairment in Lakes/Reservoirs [a,b]

Report for Water Type: LAKE/RESERVOIR/POND; Units: ACRES

Source	Total Size
AGRICULTURE-ANIMAL FEEDING/HANDLING OPERATIONS (NPS - NOT REGULATED)	68.37
Agriculture	68.37
AGRICULTURE-CROP PRODUCTION	90.69
Agriculture	68.37
Pesticide Application	22.32
AGRICULTURE-GRAZING-RELATED SOURCES	4576.77
Rangeland (Unmanaged Pasture) Grazing	4508.4
Agriculture	68.37
HABITAT ALTERATIONS (NOT DIRECTLY RELATED TO HYDROMODIFICATION)	9015.99
Loss of Riparian Habitat	4523.25
Streambank Modifications/destabilization	4492.74
HYDROMODIFICATION	36.21
Highway/Road/Bridge Runoff (Non-construction Related)	36.21
INDUSTRIAL PERMITTED DISCHARGES	860
Petroleum/natural Gas Production Activities (Permitted)	860
STORMWATER PERMITTED DISCHARGES (DIRECT AND INDIRECT)	896.21
Highway/Road/Bridge Runoff (Non-construction Related)	36.21
Petroleum/natural Gas Production Activities (Permitted)	860
NATURAL	274.32
Natural Sources	274.32
RECREATION AND TOURISM (NON-BOATING)	596.2
Other Recreational Pollution Sources	596.2
SILVICULTURE-LARGE-SCALE (INDUSTRIAL) FORESTRY	252.44
Silviculture Harvesting	223.78
Siliviculture, Fire Suppression	28.66
SILVICULTURE-NON-INDUSTRIAL FORESTRY (WOODLOTS)	28.66
Siliviculture, Fire Suppression	28.66
TURF MANAGEMENT	22.32
Pesticide Application	22.32
URBAN-RELATED RUNOFF/STORMWATER (OTHER THAN REGULATED DISCHARGES)	126.46
Highway/Road/Bridge Runoff (Non-construction Related)	36.21
Impervious Surface/Parking Lot Runoff	90.25
OTHER	371.35
Natural Sources	274.32
Agriculture	68.37
Siliviculture, Fire Suppression	28.66

[a] This information is generated using the USEPA's *ADB* software.

[b] In most instances, more than a single source contributed to water quality impairment. Where waterbodies have more than one source of impairment, the appropriate waterbody length is entered in each category.

Table 8. Total Stream Miles Not Fully Supporting Designated or Attainable Uses [a]

-- By Cause Category --

Causal Category	Total Size [b] (miles)
Biological impairment	0.0
Biological criteria	30.19
Cause unknown	113.23
Unknown toxicity	16.44
Pesticides -- DDT	11.57
PCBs	9.17
Copper -- acute	9.71
Lead -- chronic	50.14
Mercury -- chronic	11.80
Selenium -- chronic	0.40
Zinc -- acute	9.71
Aluminum -- acute	124.22
Aluminum -- chronic	0.40
Total ammonia	30.12
Chlorine	44.79
pH	67.54
Turbidity	630.90
Siltation	0.5
Dissolved oxygen	119.78
Salinity/TDS/chlorides	77.65
Temperature	874.14
Stream bottom deposits	1,257.12
Fecal coliform	110.80
Total phosphorus	5.61
Total organic carbon	284.93
Conductivity	207.34
Plant Nutrients	161.91

[a] This information was generated using the USEPA's *ADB* software.

[b] In most instances, more than one causal agent contributed to water quality impairment. Where waterbodies have more than one cause of impairment, the appropriate waterbody length was entered in each category.

Table 9. Total Stream Miles Not Fully Supporting Designated or Attainable Uses [a]

~ By Source Category ~

Causal Category	Total Size [b] (miles)
Point Sources	
Municipal	190.02
Nonpoint Sources	
Agriculture (total)	2,071.95
Crop-related Sources	438.19
Irrigated crop production	436.99
Nonirrigated crop production	7.60
Grazing-related Sources	2,036.10
Pasture grazing - Riparian and/or Upland0)95.86	
Range grazing - Riparian and/or Upland	1,967.54
Intensive Animal Feeding Operations	14.64
Aquaculture	14.64
Off-farm Animal holding/management area	24.21
Silviculture (total)	244.56
Harvesting, restoration, residue Management	77.65
Forest management (pumped drainage, fertilization, pesticide)102.45	
Forest Management (fire suppression)	127.89
Logging Road construction/maintenance	71.42
Construction (total)	167.28
Highway/road/bridge	50.46
Land development	132.99
Urban runoff\storm sewers	81.92
Resource extraction (total)	301.21
Surface mining	82.48
Subsurface mining	14.60
Placer mining	2.75
Dredge mining	14.27
Petroleum activities	109.76
Mill tailings	51.30
Mine tailings	72.90
Acid Mine Drainage	8.32
Abandoned mining	66.23
Land disposal (total)	191.93
Onsite wastewater system	145.02
Hazardous waste	25.34
Hydromodification (total)	648.71
Channelization	219.93
Dredging	54.08
Dam construction	36.40
Flow regulation/modification	355.66
Habitat Modification (0ther than Hydromodification)	1,765.62
Removal of riparian vegetation	1,681.32
Streambank modification/destabilization	1,476.37
Highway maintenance and runoff	702.83
Natural Sources	759.92
Recreational and Tourism activities	632.61
Road/parking lot runoff	34.67
Vehicle use in arroyos	11.20
Refuse disposal	9.17
Upstream impoundment	14.73
Source Unknown	430.05

[a] This information is generated using the USEPA's *ADB* software.

[b] In most instances, more than a single source contributed to water quality impairment. Where waterbodies have more than one source of impairment, the appropriate waterbody length is entered in each category.

Table 10. Total Lake and Playa Acres Not Fully Supporting Designated or Attainable Uses

~ By Cause Category ~

Causal Category	Total Size (acres [a])
Unknown toxicity	2.00
Boron – chronic	400.00
Copper – acute	11.16
Mercury – chronic	15,595.62
Aluminum – chronic	3760.76
Nutrients	10,301.49
Total phosphorus	23.82
pH	129.31
Siltation	16,280.68
Dissolved oxygen	72.96
Salinity/TDS/Chlorides	210.21
Temperature	68.37
Nuisance algae	4,438.77

[a] In most instances, more than one causal agent contributed to water quality impairment. All agents contributing to the impairment are identified in the table.

Table 11. Total Lake and Playa Acres Not Fully Supporting Designated or Attainable Uses

~ By Source Category ~

Source Category	Total Size (acres [a])
Point Sources	
Industrial	1,874.76
Nonpoint Sources	
Agriculture	26,798.10
Grazing related Sources	26,729.73
Range grazing - Riparian and/or Upland	26,729.73
Silviculture	176.22
Harvesting, Restoration, Residue Management	111.89
Construction	0
Urban runoff/Storm Sewers	11.59
Resource extraction	640.21
Surface Mining	210.21
Petroleum Activities	430.00
Mill Tailings	210.21
Land Disposal	23.82
Onsite Wastewater Systems (Septic Tanks)	23.82
Habitat Modification (other than Hydromodification)	8,671.53
Removal of Riparian Vegetation	8,671.53
Bank or Shoreline Modification/Destabilization	8,647.71
Pesticide application (copper sulfate)	11.61
Watershed runoff following forest fire	2.00
Atmospheric Deposition	52,504.53
Highway Maintenance and Runoff	49.09
Recreation and Tourism Activities (other than Boating)	10,779.65
Road/parking lot runoff	9,558.24
Salt storage Sites	210.21
Natural Sources	148.75
Source Unknown	44,219.48

[a] In most instances, more than one causal agent contributed to water quality impairment. All agents contributing to the impairment are identified in the table.

~~Lakes~~

~~Table 10 presents an analysis of the causal agents adversely affecting the State's lakes. Mercury, siltation, nutrients and nuisance algae are the major casual agents of use impairment. Agriculture and habitat modification are the predominant sources of lake water quality impairment (Table 11). Point sources are not a significant factor in attainment of designated uses in the State's lakes.~~

PUBLIC HEALTH~~/AQUATIC LIFE~~ IMPACTS

Measures evaluated in determining the public health and aquatic life impacts of waterborne toxic and non-toxic contamination include:

- fishing guidelines in effect;
- fishing bans in effect;
- pollution-related fish abnormalities observed;
- pollution-caused fish kills observed;
- surface drinking water supplies closed;
- bathing areas closed; and
- waterborne disease incidents.

In January 1991, the United States Fish and Wildlife Service (USFWS) presented NMED with information which indicated that at least two species of fish in Santa Rosa Reservoir were contaminated with mercury at levels which could affect human health. The United States Army Corps of Engineers also provided NMED with copies of data which also indicated that there could be significant mercury contamination of fish in the State.

The discovery of elevated levels of mercury in some reservoir fish prompted NMED, in cooperation with the New Mexico Department of Health and the New Mexico Department of Game and Fish, to issue *Fish Consumption Guidelines Due to Mercury Contamination* **(NMDOH et al. 2001)**, which are periodi-

cally updated as new information is received. The latest guidelines are contained in Appendix C.

Until the current CWA § 305(b) reporting cycle, water and sediment samples collected from lakes, reservoirs and streams did not yield detectable levels of mercury. In September 1994 a new effort was initiated to sample the stream waters and sediments in the State using experimental ultra-clean sampling and analytical methods. The ultra-clean sampling protocol was developed in conjunction with the Cincinnati EPA National Exposure Research Laboratory, which conducted the low-level mercury analyses gratis in order to fully develop the sampling and analytical methods using "real-world" samples. The Laboratory was able to reproducibly analyze levels to 0.7 ng/L (parts per trillion). The study revealed that low levels of mercury in surface waters are common throughout New Mexico and that higher levels are found in isolated locations and in some stream sediments. The elevated levels that have been found in fish are due to a process called biomagnification. This process starts with the methylation of the elemental mercury by microorganisms present in the organic layers found at the bottom of large bodies of water. These low concentrations of the organic methylated form of mercury are then passed through the trophic web progressively from smaller to larger and larger fish until the result is elevated levels in the larger fish. These elevated mercury levels are especially evident in the top predatory fish such as walleye, bass and perch, as well as some of the bottomfeeders such as catfish. **Because New Mexico currently only has mercury criteria for levels in water, elevated levels of mercury in fish tissue and/or sediment does not affect designated use attainment status.**~~Because of the low concentrations of mercury in waters, all other designated or attainable uses including primary and/or secondary recreation, livestock watering and wildlife habitat, and irrigation are not currently affected by this pollutant.~~

To date, only one fishing ban has been issued in New Mexico **by the National Park Service**. The single instance of a fishing ban issued in 1989 and still in effect, was initially due to the suspected presence of polychlorinated biphenyls (PCBs) in trout in the Rito Cañon de Frijoles located wholly within Bandelier National Monument. Additional surveys conducted by the National Park Service and NMED did not con-

firm the high levels of PCBs in fish or sediment but did identify relatively high concentrations of DDT (1,1,1-trichlor-2,2-bis-(p-chloro-phenyl) ethane) and its decomposition products. **The source of DDT was a pesticide drain in the area. The National Park Service implemented a remediation plan to removed contaminated soil around the drain. As a precautionary measure, the fishing ban is still in effect. NMED sampled Rito de los Frijoles as part of the 2001 Upper Rio Grande Part 2 survey. PCBs, DDT, and its decomposition products were not detected in any ambient water samples.** ~~The National Park Service has conducted an intensive survey of the area to try to identify and pinpoint the sources of the contamination, and is currently implementing remediation efforts.~~

~~No surface drinking water supplies were closed due to public health concerns during 2000-2001. There has been a closure on Burn Lake in Las Cruces due to excessive pathogens.~~

~~OTHER WATER QUALITY ASSESSMENT MEASURES FOR STREAMS AND LAKES~~

~~NMED also uses the following measures to assess the water quality status of New Mexico's streams and lakes and to direct programmatic activity:~~

~~Water Quality Limited Segments~~

~~Section 303(d) of the federal Clean Water Act requires states to designate "water quality limited" stream segments where applicable water quality standards are not being met, or are not expected to be met even after the application of technology-based effluent limitations. Identification of a segment as "water quality limited' requires the state to:~~

- ~~Calculate a total maximum daily load (TMDL), which considers seasonal variations and margins of safety, for the segment. The TMDL is the water segment's capacity to accept point and nonpoint pollution loadings, as well as natural background levels, while maintaining parameter levels which assure protection and propagation of indigenous populations of fish, shellfish, and other wildlife, while maintaining the State's water quality standards;~~
- ~~Develop more stringent effluent limitations, if necessary, for point sources; and~~

~~Develop best management practices, where appropriate, to mitigate nonpoint source pollution.~~

~~The current State list for streams requiring TMDL work is analogous with Appendix B.~~

~~Water Quality Trends~~

~~No water quality trend information based on ambient data has been developed for New Mexico. The United States Geological Survey is the only source in the State of longterm water quality data at fixed stations. Overall, it is difficult to compare the use assessment discussed above to earlier use assessments due to lack of historic data, increase in the number of stream reaches and lakes assessed, changes in the use attainment protocol, and the adoption of standards for additional contaminants or changes in standards, as the need for these are identified. It should be noted, that most of the statistical techniques designed to evaluate trends have significant data requirements and greater mathematical assumptions.~~

STATUS OF NEW MEXICO WETLANDSCurrent Status

The USFWS has mapped wetlands in New Mexico using the Cowardin system. The USFWS estimates that there are approximately 481,900 remnant acres of wetlands in New Mexico. The USFWS further estimates that there were 720,000 acres of wetlands in New Mexico in the 1780s based on the existing distribution of hydric soils. Hence, there has been a 33% reduction in the State's wetlands in historical times.

Individual wetlands have not yet been classified in the State water quality standards, thus do not have designated uses, but do have at least the existing use of livestock watering and wildlife habitat. Wetlands, however, were defined in the State's water quality standards as "waters of the State" during the 1990-1991 triennial standards review. As waters of the State, wetlands are protected under the general standards, the antidegradation policy, and any existing or attainable use under §20.6.4.900 NMAC of the State water quality standards. The overall status of wetlands in New Mexico with respect to attainment of CWA objectives is not known, but due to historical trends, point and nonpoint source discharges and drainage practices, all wetlands are considered threatened in New Mexico.

Future Direction

Wetlands and riparian areas, threatened in New Mexico, are of great importance for maintaining water quality and quantity, stabilizing stream banks, providing flood control, as well as providing habitat for fish and other wildlife. NMED in conjunction with EPA has entered into a five-year project with the University of New Mexico, New Mexico Heritage Program to develop a basic description of the diversity of riparian vegetation types in relation to soils and the hydrology and other environments in which they occur, their successional relationships, and management strategies. This work is especially important in light of the New Mexico definition of wetlands, which are, *"those areas which are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions in New Mexico,*" (Section 20.6.4.7.CCC of the Standards for Interstate and Intrastate Surface Waters in New Mexico).

This project will provide an essential component of the New Mexico Wetlands Conservation Plan, which is currently in the process of being developed, by identifying important riparian/wetland areas in New Mexico and their particular management opportunities. Information produced by this project will enable the State to more precisely identify goals for the protection, enhancement and restoration of riparian/wetland areas throughout New Mexico. The products of this study will include a preliminary hierarchical classification system describing the general physiographic, edaphic and floristic features for riparian/wetland community types as well as dichotomous keys, descriptions and management information.

A five-year study has been completed on the Pecos, Upper and Lower Rio Grande, Gila, San Francisco, San Juan, Little Colorado and Mimbres watersheds. The fifth year's study included performing a classification study of the Arkansas-White-Red Rivers Watersheds and testing the Wetlands Assessment Manual in preparation for the production and printing of the Statewide Wetlands/ Riparian Assessment classification system.

Middle Rio Grande Ecosystem: Bosque Biological Management Plan

The Bosque Biological Management Plan was created to mitigate the stress in the Middle Rio Grande Valley from Cochiti Dam to San Marcial and to develop a new approach to sustain and enhance the biological quality and ecosystem integrity of the middle Rio Grande bosque, together with the river and floodplain that it integrates. The plan was proposed by the Rio Grande Bosque Task Force, a citizen's group formed by United States Senator Pete Domenici to examine the bosque's problems, to solicit public involvement and to recommend the means for its protection and the continuation of its benefits to human society. An interagency team of biologists from the USFWS, the United States Army Corps of Engineers, the United States Bureau of Reclamation and the University of New Mexico was appointed to develop the plan in consultation with scientists, historians and other experts on the Middle Rio Grande Valley.

The plan's goals are as follows: (1) synthesize past and present available information about the ecosystem; (2) identify key species, communities and ecological processes essential to sustaining the ecosystem's biological quality and integrity; (3) recommend procedures for monitoring, conducting research and managing the ecosystem; and (4) identify procedures for incorporating new information and recommendations into the management plan.

New Mexico's Assessment Protocol is based primarily on ambient physical/chemical and biological water quality data. NMED recognizes the value of other relevant data produced through the growing emphasis on biological and toxicological testing and has incorporated these types of data into the special water quality surveys being conducted.

Use attainment methodology will be in a state of flux over the next ten years as it adapts to meet the changing face of surface water concerns, such as the development of standards for lakes and reservoirs, playa lakes and wetlands, and as strategies are developed to protect them.

PROGRAMS FOR SURFACE WATER POLLUTION CONTROL

New Mexico uses a variety of mechanisms including State, federal, and/or local components to protect its surface waters from becoming polluted by point source discharges from municipal and non-

municipal (i.e., industrial, state, and federal) sources. The principal mechanism is the federal National Pollutant Discharge Elimination System (NPDES) permit program. Under this program, a permit specifies the total amount and concentrations of contaminants that a permittee may discharge to a watercourse.

Pretreatment of industrial wastes that enter municipal wastewater treatment plants helps ensure that receiving waters are not polluted, that treatment processes are not disrupted, that NPDES permit limitations are not exceeded, and that toxic pollutants do not excessively contaminate sludge. While five cities in New Mexico are required to have federally approved pretreatment programs as part of their NPDES permits, the establishment and enforcement of an industrial waste ordinance by a municipality is basically a local responsibility.

Between 1972 and 1989, the federal wastewater construction grants program provided grants to local communities for planning, design, and construction of wastewater treatment plants. These plants were designed to prevent and abate water pollution, promote public health and meet enforceable requirements of the federal Clean Water Act (CWA). Since 1988 the federal grant program has been replaced with the State revolving loan program administered by the New Mexico Environment Department (NMED) under the New Mexico Water Quality Control Commission (WQCC) regulations.

Pursuant to CWA § 404, the United States Army Corps of Engineers regulates dredge-and-fill operations in surface waters and wetlands of the State. **Under CWA §401,** NMED is statutorily (§ 74-6-4.E. NMSA 1978) charged to review each permit for conformance with State and federal law, regulations and water quality standards. **This function is performed by the Watershed Protection Section (WPS) of SWQB.**

In addition to these federal programs, the State has developed several other mechanisms under WQCC regulations (20.6.2 NMAC) to protect surface water quality~~(11)~~. 20.6.2.1203 NMAC of these regulations contains a section which requires spill reporting and cleanup. 20.6.2.2000 NMAC et. seq. provides the basis for management of discharges to surface waters as well as for enforcement action against discharg-

ers in violation of State or federal regulations.The State operator certification and training program under 20.7.4 NMAC improves operator expertise regarding treatment processes and treatment plant operation. This part also ensures that treatment plants are adequately staffed by operators with the requisite training. These requirements help to ensure that NPDES permit limitations or approved ground water discharge plan requirements are met by treatment plant discharges to surface watercourses or ground water, respectively.

20.7.5 NMAC regulations are used in administration of a State revolving loan fund. This fund provides low-interest monies for local authorities such as cities, counties, sanitation districts and Indian tribes for wastewater treatment plant construction.

In addition to regulatory measures, the WQCC has also approved a nonpoint source management program **administered by the Watershed Protection Section (WPS) of SWQB**. This program is largely based on the voluntary implementation of Best Management Practices (BMPs).

This **rest of this** chapter discusses the ~~uses of the mechanisms~~**programs** mentioned above for surface water pollution control in New Mexico **in further detail**.

THE STATE ROLE IN THE NPDES PROGRAM

While NPDES permits for discharges in New Mexico are issued and enforced by the United States Environmental Protection Agency's (EPA) Region 6 office located in Dallas, Texas, the State plays a significant role in this permit program[1]. NMED is statutorily (§ 74-6-4.E. NMSA 1978) charged with responsibility for certification of NPDES permits pursuant to CWA § 401. NMED also receives a grant from the EPA to assist with the administration of the NPDES permit program.

Currently, there are ~~119~~**116** individual NPDES permits issued to dischargers in New Mexico (Figure ~~7~~**4.4**). The number of NPDES permits increased moderately between 1984 and 1990 but stabilized in recent years. ~~However, the number of permits is expected to increase dramatically upon implementation of the new NPDES sludge permitting program and if EPA begins permitting discharges into playa lakes.~~

Since 1992 EPA has issued ~~6~~**7** NPDES "general" permits in New Mexico. These permits are for: (1)

onshore oil and gas extraction, (2) storm water (baseline construction activities), (3) storm water (baseline non-construction-industrial activities), (4) storm water (multi-sector industrial activities), (5) concentrated animal feeding operations**,** ~~and~~ (6) underground storage tank (UST) remediation **and (7) EGG Production**. EPA Region VIII (Denver) has issued a general permit on the Southern Ute Indian Reservation adjoining New Mexico's northern border for activities associated with coal bed methane gas development on the Reservation.

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[1] In 1991, EPA Region 6 Offices in Dallas, Texas transferred their administrative responsibilities for NPDES permit program on the Navajo Reservation within New Mexico to EPA Region 9 Offices in San Francisco, California.

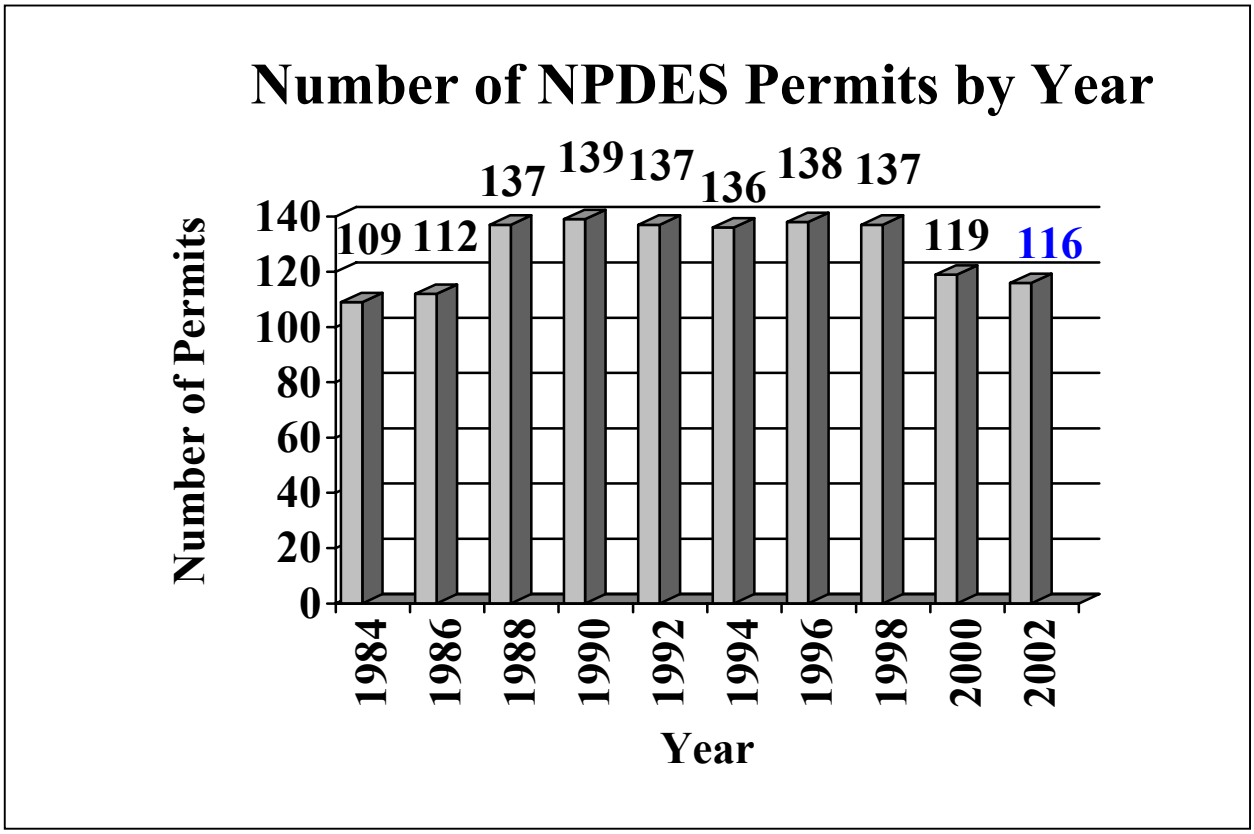
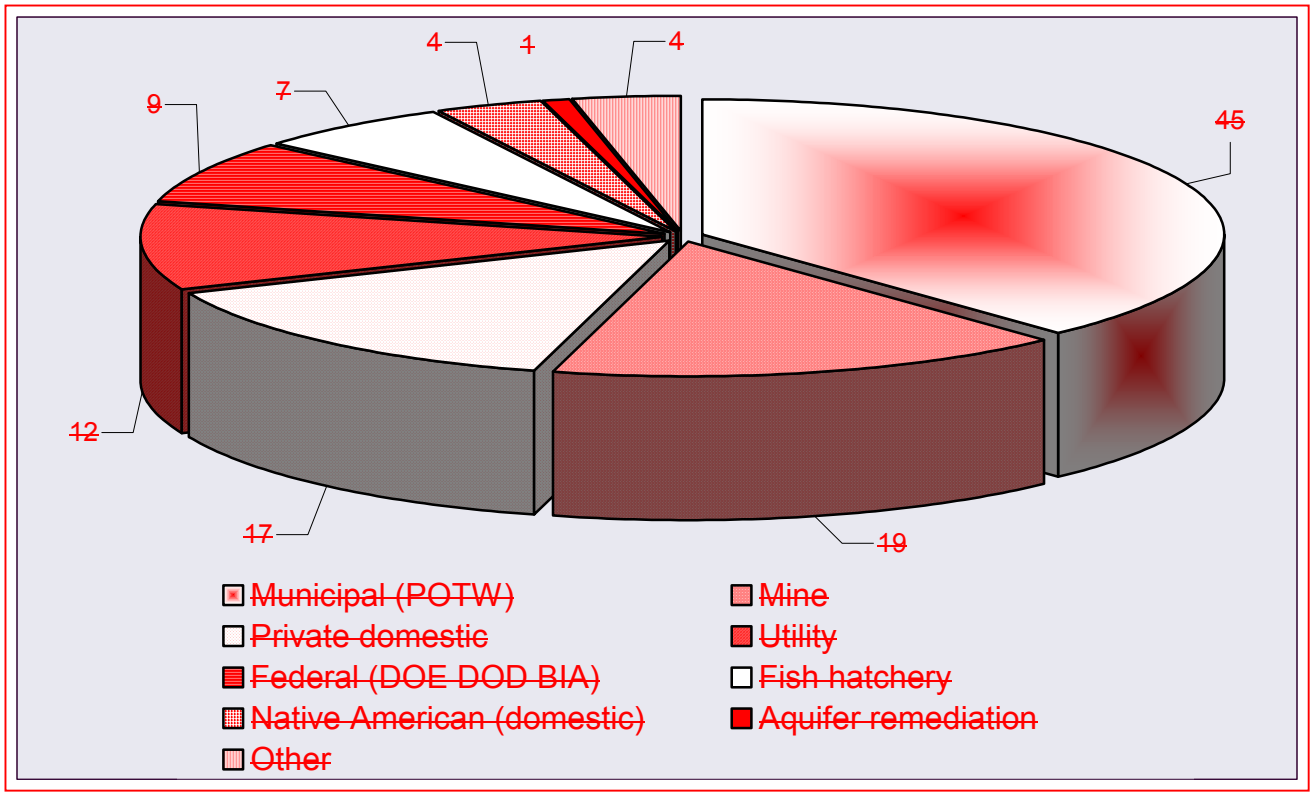


Figure 4.47. Number of NPDES Permits in New Mexico by Year.



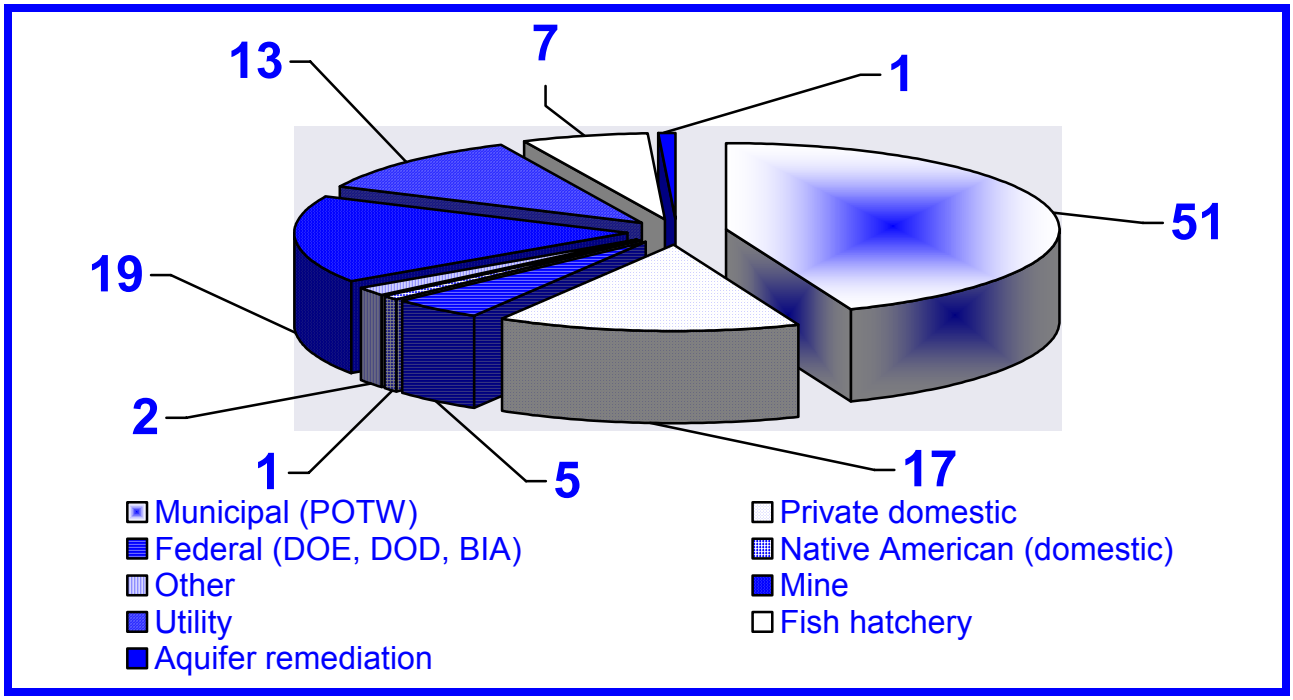


Figure 4.5~~8~~. Distribution of NPDES Facilities by Activity. ~~118~~**116** total permits.

Federal NPDES Permits

EPA categorizes NPDES permits as either "municipal" or "non-municipal." Municipal permits are issued for publicly-funded community wastewater treatment plants. Other discharges are classified as non-municipal. New Mexico is unique in that many of the non-municipal sources, often referred to as "industrials," are small private domestic wastewater discharges (privately-owned sewage treatment plants) or mines rather than the types of discharges commonly assumed when the word "industrials" is used (Figure ~~8~~**4.5**).

NPDES permittees are further categorized by EPA as either "major" or "minor" dischargers. Major municipal permittees are classified as such if they have a one million gallons a day or greater design flow capacity or, in a few instances, where design flow is less than a million gallons, they have **tertiary treatment** ~~other concerns such as water quality based effluent limits~~. Industrial permittees are classified based upon a number of factors which include, but are not limited to type of industry, chemical constituents in the discharge, or use designation of the receiving stream. There are currently ~~23~~**25** major municipal and ~~eight~~**8** major industrial permittees in New Mexico (Figure ~~9~~**4.6**).

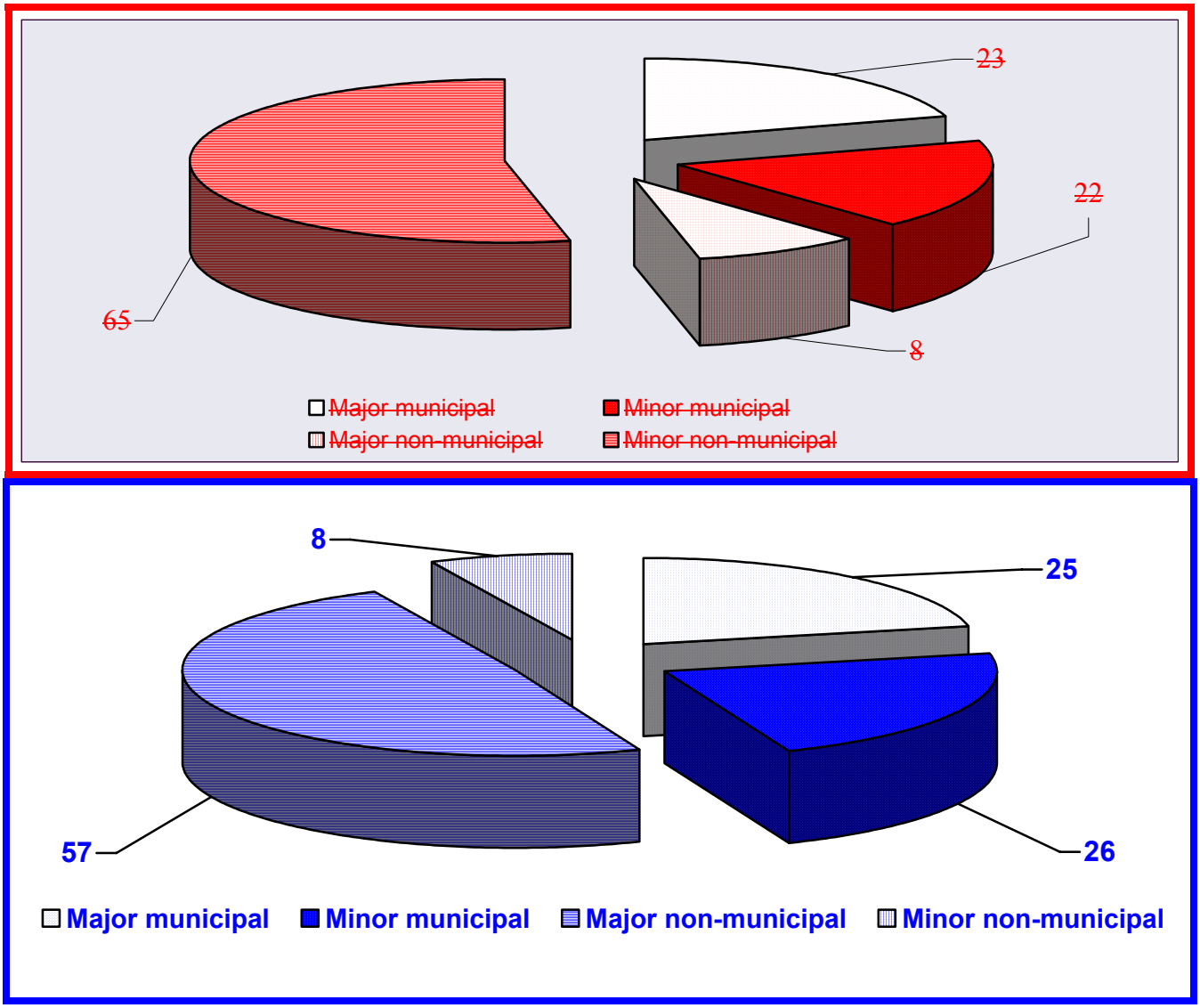


Figure ~~9~~4.6. Distribution of NPDES Facilities in New Mexico by Size and Type. ~~118~~116 total permits.

State Certification of NPDES Permits

Prior to issuing any NPDES permit in final form, EPA must first obtain from the State a certification that the proposed NPDES permit is consistent with State and federal requirements. NMED performs this task as a statutory responsibility. Through certification, NMED verifies that the conditions of the NPDES permit meet applicable provisions of the federal Clean Water Act as well as applicable State requirements such as water quality standards, and the water quality management plan (Figure ~~14~~4.9).

One example of the importance of State certification relates to the State's concern that public health, irrigation waters, and livestock and wildlife be protected from the pathogens present in domestic sewage.

The State water quality management plan consequently requires, as a condition of State certification, that permittees who discharge sewage effluent meet a maximum concentration of 500 fecal coliform bacteria per 100 milliliters effluent limit. A second example relates to permits issued in the San Juan River Basin which is part of the Colorado River Basin. For these permits, New Mexico requires the inclusion, as required by water quality standards, of certain conditions necessary to implement State surface water quality standards adopted to support the program and policy of the Colorado River Basin Salinity Control Forum. NMED also reviews proposed NPDES permits to ensure that "no toxics in toxic amounts" are in the effluent. This review is in response to the long-standing Congressional mandate that toxic pollutants be controlled. To this end, NMED has required a number of permittees to control chlorine in their final discharges. Some permittees have also received water quality-based effluent limitations to control specific metals (e.g., Las Cruces has a copper limit and Silver City a vanadium limit). These controls are necessary to implement the State's water quality standards.Between ~~September 1998~~**August 2001** and ~~July 2001~~**August 2003**, ~~21~~**8** major municipal, ~~14~~**13** minor municipal, ~~8 major industrial, 3 Department of Defense, 44~~**17** minor industrial, and ~~one~~**3** general NPDES ~~permit~~permits were reviewed for State certification. During 1999, 2000, and 2001 EPA has made a priority of reducing the backlog of expired permits. NMED has worked with EPA to reduce the backlog. The attached pie charts (Figures ~~10 – 13~~**4.7 - 4.8**) show the reduction of backlogged permits during this time frame.

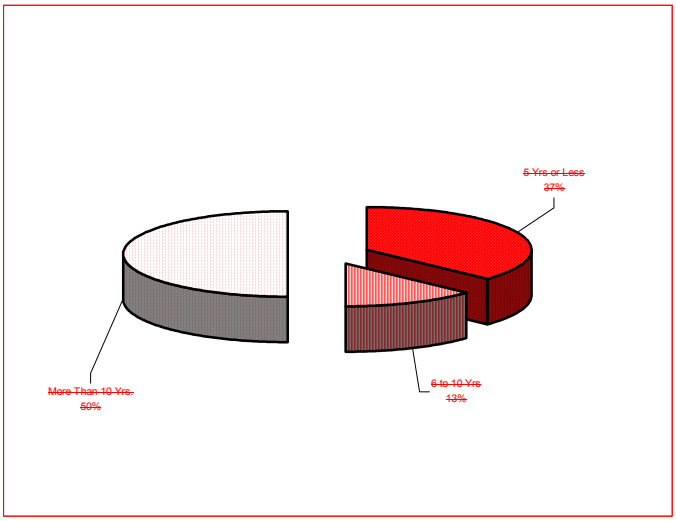


Figure 10. Municipal NPDES Permit Age Distribution as of June 20, 2000.

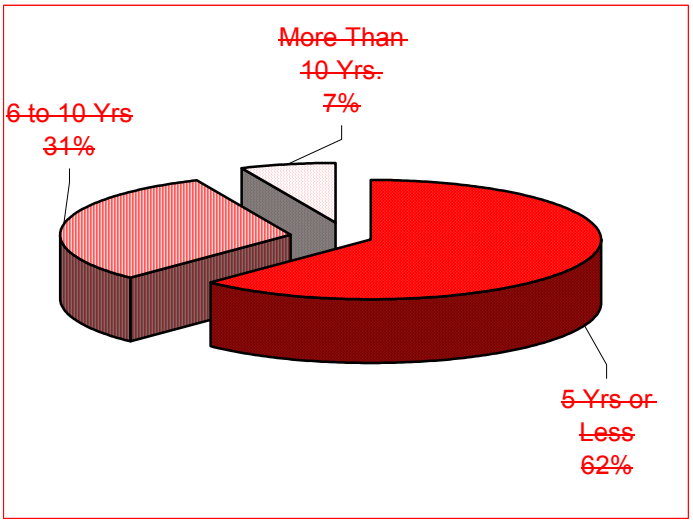


Figure 11. Municipal NPDES Permit Age Distribution as of Oct. 17, 2001.

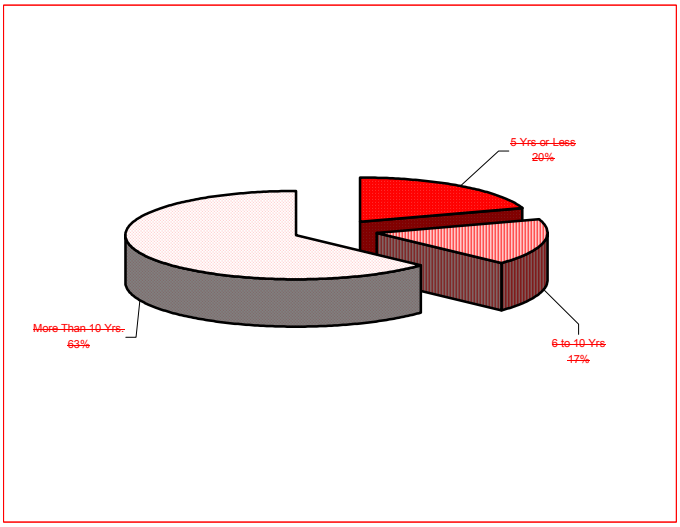


Figure 12. Non-Municipal NPDES Permit Age Distribution, as of June 20, 2000.

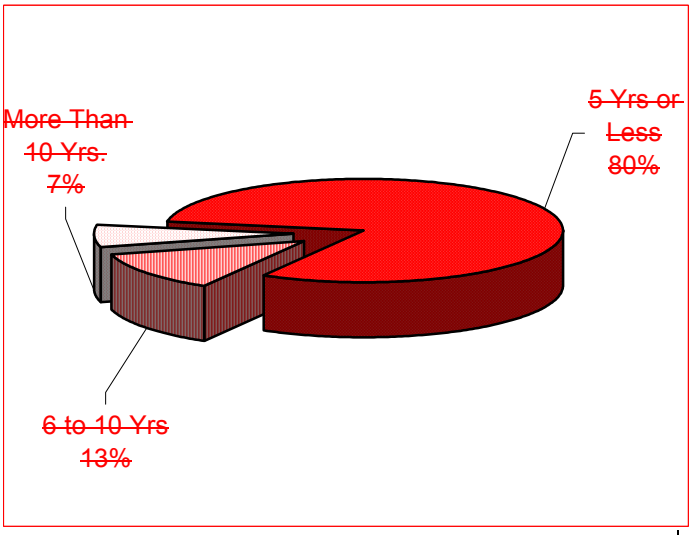


Figure 13. Non-Municipal NPDES Permit Age Distribution, as of Oct. 17, 2001.

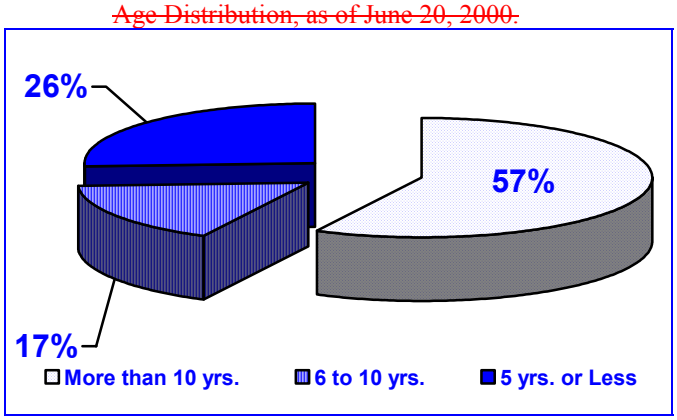


Figure 4.7. Age Distribution of NPDES Permits June 20, 2000

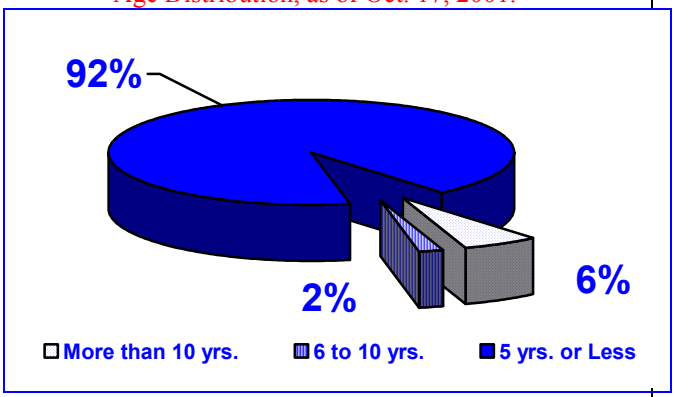
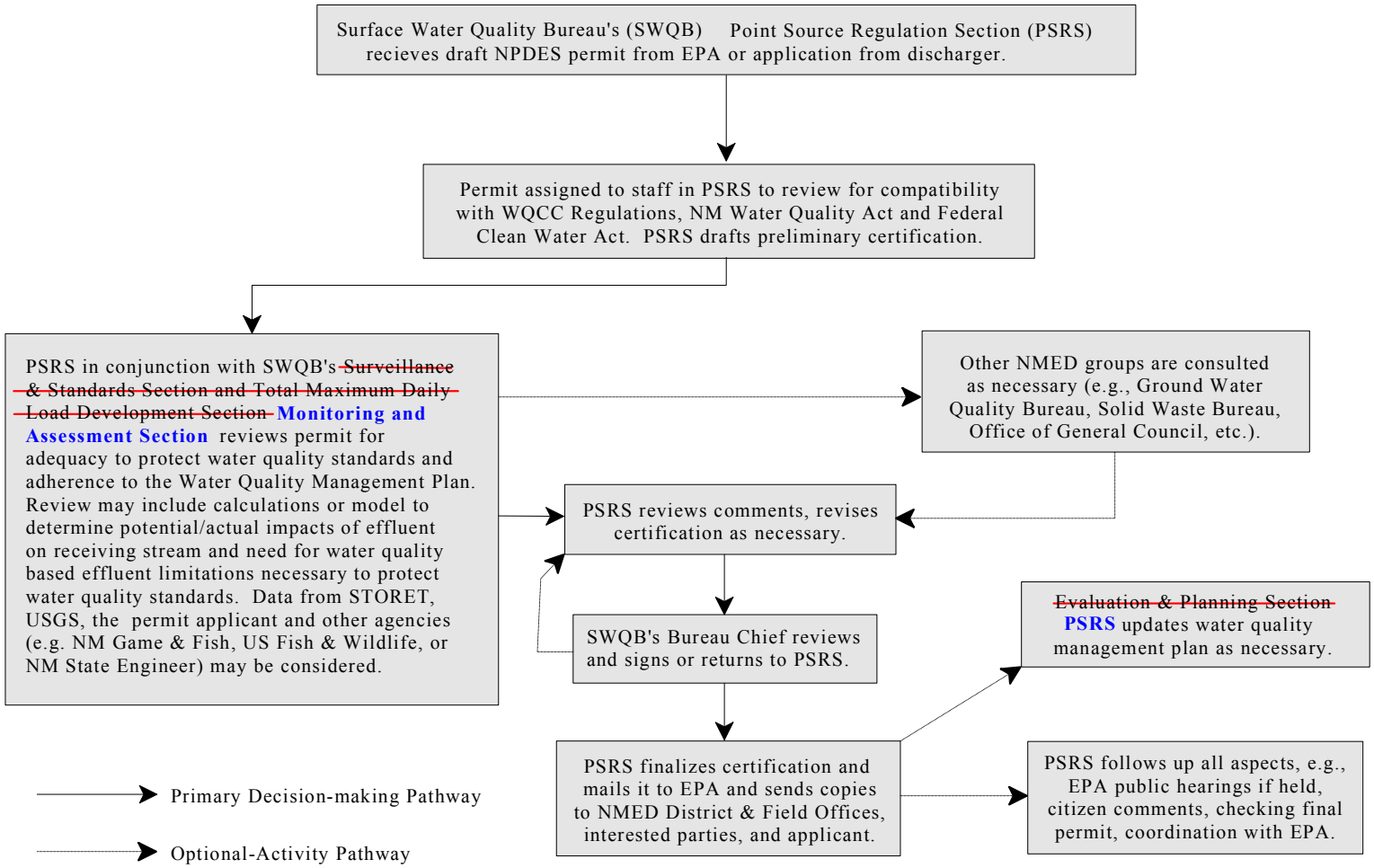


Figure 4.8. Age Distribution of NPDES Permits August 26, 2003

Figure ~~14~~4.9. New Mexico Environment Department NPDES Permit Certification Process.



State Administrative Assistance

NMED assists EPA in administering the NPDES permit program by reviewing self-monitoring data submitted by all NPDES permittees, providing program information and training to the public and permittees, and conducting inspections of permittees. NMED also assists EPA NPDES permit writers by providing technical information necessary to draft the permit. Information provided includes: data on critical low-flow of the receiving waters, water quality data for the receiving stream, water quality standards applicable to the receiving stream, and other site specific information. Information provided by NMED helps expedite the permit issuance process. NMED prepared an interim guidance document for implementation of water quality standards through NPDES permits. That document assists NPDES permit writers with developing water quality based effluent limits. It also provides the NMED with a "yardstick" for certifying NPDES permits in a consistent manner.

As required by EPA policy, all active permitted facilities classified as major, whether municipal or non-municipal, should be inspected annually by either EPA or NMED. This effort is coordinated by the two agencies at the beginning of each year to minimize overlap. Since neither agency has resources to inspect every minor discharge each year, NMED uses a priority list to direct inspection efforts among these facilities. The priority list is based upon the date of last inspection; those facilities that have gone the longest without inspection receive higher priority.

NMED conducts four types of compliance inspections at permitted facilities as part of its contractual assistance to EPA:

- **Compliance Evaluation Inspection:** Designed to verify NPDES permittee compliance with self-monitoring requirements and compliance schedules, the compliance evaluation inspection is based on record reviews and a visual examination of treatment facilities, effluent, and receiving waters.
- **Compliance Sampling Inspection:** In addition to the tasks and objectives summarized above, a compliance sampling inspection includes analysis of effluent quality. Effluent samples are collected

and flow measurements are verified by NMED. Data from an inspection may be used to verify accuracy of the self-monitoring report or as evidence in enforcement proceedings. Samples of the receiving stream above and below the outfall are also collected in ~~most~~**some** instances in order to evaluate the actual chemical impact of the effluent on the stream thus insuring the environmental efficacy of the NPDES permit.

· ~~**Performance Audit Inspection:** A performance audit inspection is conducted primarily to evaluate the NPDES permittee's sampling and laboratory procedures. In addition to verifying the permittee's reported data and permit compliance through a check of the records, NMED staff actually observe the permittee going through the steps of the self-monitoring process from collecting samples and measuring flow through laboratory analysis, data processing, equipment calibration, and report preparation.~~

· **Reconnaissance Inspection:** A reconnaissance inspection is an abbreviated inspection often used to determine the general status of a facility or to focus on only one aspect (e.g., effluent quality) of compliance without performing a complete review. ~~In the last biennial, the NMED developed two additional subcategories of reconnaissance inspections. These new categories are for facilities operating under the EPA general permits for storm water and for "sludge only" facilities [2].~~

Between ~~October~~**August** ~~1998~~**2001** and ~~July~~**June** ~~2001~~**2003** NMED conducted ~~39~~**53** compliance evaluation inspections~~,~~ **and** 1~~3~~**4** compliance sampling inspections~~, 5 reconnaissance inspections~~ of individual NPDES permittees **for EPA**~~, 15 reconnaissance inspections, 33 compliance evaluation inspections of facilities discharging under a storm water general permit, and 19 compliance inspections of confined animal feeding operations for EPA~~. **During this time period NMED conducted 106 compliance evaluation inspections of facilities discharging under a storm water general permit, and 37 compliance evaluation inspections of confined animal feeding operations for EPA.** In the same period EPA also conducted ~~46~~**20** compliance evaluation inspections. NMED also assisted EPA with follow-up to these inspections by provid-

ing requested information and participating in enforcement meetings between EPA and permittees.

Pretreatment

'Pretreatment' refers to treatment of waste before it enters a wastewater treatment plant in order to remove, or make less harmful, certain components of that waste. A municipality is responsible for regulating what comes into its wastewater treatment plant and ensuring that: (1) the effluent limits specified in its NPDES permit are met; (2) its sludge does not become contaminated; and (3) its treatment processes are not upset by incoming waste.

While most municipalities have adopted some industrial waste ordinance, certain larger communities or communities with specific industrial users connected to their sewer systems are further required to adopt an EPA-approved pretreatment program. In general, industrial or sewer- use ordinances, unless incorporated into a formal pretreatment program under the NPDES permit program, are poorly enforced by the municipality. Pretreatment programs under the NPDES permit tend to be better enforced because the municipality has proper operation of the program as a requirement in its NPDES permit. Moreover, the pretreatment program itself is subject to EPA inspections and is, therefore, subject to EPA enforcement if it is not administered correctly.

Currently, five New Mexico communities - Albuquerque, Santa Fe, Las Cruces, Farmington, and Roswell - have EPA-approved pretreatment programs in their NPDES permits.

~~[2] The term *sludge-only facilities* refers to treatment works treating domestic sewage that are not otherwise required to obtain an NPDES permit for discharges of effluent into a "*waters of the United States*". Sludge-only facilities are required to meet federal regulations adopted under CWA § 405 that are published in the Code of Federal Regulations (40 CFR 503). Examples of sludge-only facilities in New Mexico are Clovis and Hobbs.~~

Present and Emerging Concerns

Sewage Sludge

On February 19, 1993, the EPA published a new rule for **domestic** sludge disposal, codified at 40 CFR 503. The new regulations are comprehensive in their approach to environmental protection. They increase the responsibilities of sludge generators in regard to the disposition of their sludge. The regulations are also designed to encourage beneficial reuse of the sludge. Coordination of the federal regulation with state ground water protection regulation is ongoing.

The New Mexico Solid Waste Management Regulations (~~12~~**NMEIB 1995**) also govern sludge disposal at landfills. Sludge disposal is allowed in landfills provided it meets certain criteria. These criteria should ensure environmentally safe disposal of sludge at landfills.

~~A demonstration project by the US Forest Service and the City of Albuquerque won an EPA award. The project demonstrated the value of land applying treated sludge or "biosolids" in rangeland reclamation. Improved vegetative cover as well as increases in desirable plant species and decreases in undesirable species was demonstrated. A separate but similar demonstration project showed essentially no runoff from sloped lands that had been treated with biosolids. Control of runoff reduces soil erosion which may adversely impact future land use and prevents sedimentation of nearby streams.~~

Overall, in 200~~0~~**2**, 25% of the biosolids generated by New Mexico's wastewater treatment facilities was beneficially reused~~, mainly due to the aforementioned demonstration projects~~. Several smaller cities are beneficially reusing 100% of their biosolids. Increased compliance with sludge regulations and improvements in sludge treatment encouraged by the regulations is providing communities greater opportunities to dispose of their biosolids in beneficial ways rather than in a landfill. Increasing the beneficial reuse of biosolids remains an important aspect of the State's wastewater program.**Storm Water**

The federal Water Quality Act (WQA) of 1987 added § 402(p) to the CWA. Section 402(p) of the CWA requires the EPA to establish phased and tiered requirements for storm water discharges under the

NPDES program. In 1990, EPA promulgated regulations which established permitting requirements, including deadlines, for certain storm water discharges associated with industrial activity, and discharges from municipal separated storm sewer systems (MS4s) serving a population of 100,000 or more. These are commonly known as phase I facilities. **In 1999, EPA promulgated additional regulations which established permitting requirements, including deadlines, for discharges from small MS4s (those serving a population less than 100,000) and construction sites that disturb one to five acres. These are commonly known as phase II facilities. Phase II facilities** ~~Most other dischargers of pollutants in storm water to navigable waters from point sources (phase II facilities which include commercial, retail and institutional facilities, construction activities under five acres, and MS4s serving populations of less than 100,000), have~~ **had** until March 10, 2003 to submit NPDES permit applications.To this end, EPA originally developed a four-tier approach to permitting storm water discharges. The following is a summary of EPA's risk-based permitting strategy:

Tier I: Minimum baseline general permit for most discharges;

Tier II: Watershed permitting - target facilities within adversely impacted watershed for individual or watershed-specific permits;

Tier III: Industry specific permitting - industrial categories will be targeted for individual or industry-specific general permits; and

Tier IV: Facility-specific permitting - target individual facilities causing particularly severe impacts for individual permits.

This approach has resulted in the issuance (by EPA) of a very limited number of individual permits, two baseline general permits (one for five or more acre construction activities, one for all other phase I industrial facilities) in 1992, and one industry specific multi-sector permit **(MSGP)** which ~~covers~~ **covered** 29

industrial groups, in 1995. **The MSGP was re-issued in 2000 and now covers 30 industrial groups. The construction general permit was most recently re-issued in 2003 and now covers both phase I (five acre or more) and phase II (one to five acre) construction activities.** ~~The construction general permit expired in 1997 and was re-issued in 1998. The baseline industrial general permit expired in 1997 and has been replaced with the multi-sector general permit which was modified extensively in 1998 and now covers 30 industrial groups.~~ EPA has yet to issue a pending **phase I** MS4 permit to the City of Albuquerque, which is the only New Mexico community that currently meets the phase I criteria. **. EPA also has yet to issue a phase II MS4 general permit for small MS4s.**

This program has significantly increased the burden on state, and to some extent, local government agencies, especially in the area of public outreach regarding permitting, implementation of appropriate storm water runoff control practices, and other requirements of this program. In addition, MS4 operators are required to establish a comprehensive storm water management program to control pollutants from the MS4 which includes controls on the quality of storm water discharges from industrial (including construction) sites, identification and prohibition of illicit discharges to the MS4, and controls of spills, dumping and disposal of materials other than storm water into the MS4.

However, it is anticipated that the reduction of pollutant loads in storm water runoff from facilities regulated under this NPDES program, in combination with efforts to reduce other diffuse sources of water pollution, such as through State Nonpoint Source Control Programs developed under § 319 of the CWA, should ultimately help alleviate a significant cause of water quality impairment in New Mexico.

Concentrated Animal Feeding Operations

On February 12, 2003, the EPA published new rules for Concentrated Animal Feeding Operations (CAFOs). These rules revised two sections of the Code of Federal Regulations (CFR), the NPDES permitting requirements for CAFOs (§ 122) and the Effluent Limitations Guidelines and

Standards (ELGs) for CAFOs (§ 412). Significant changes include a mandatory requirement that, effective April 14, 2003, all large CAFOs apply for NPDES permit coverage regardless of their ability to contain all manure, litter, and process wastewater (including the runoff and the direct precipitation from a 25-year, 24-hour rainfall event). In addition, all CAFOs covered by an NPDES permit are required to develop and implement a nutrient management plan which incorporates best management practice requirements that apply to both the production and land application areas under the control of the CAFO operator. Coordination of the federal regulations with state ground water protection regulations is ongoing.

Under the old rules, a general permit was issued by EPA in 1993 which controlled discharges from some CAFOs. Although there are approximately 150 large CAFOs in New Mexico, due to a lack of clarity regarding which facilities were required to obtain permit coverage under the old rules and this general permit, only approximately 50 facilities actually obtained permit coverage. EPA has yet to issue a general permit under the new rules to replace and update the now expired (1998) 1993 permit.

These controversial programmatic changes have significantly increased the burden on state agencies, especially in the area of public outreach regarding permitting, preparation and implementation of nutrient management practices, coordination with other regulatory programs and agencies, developmentation of technical practices, and other requirements of this greatly expanded program. Through implementation of nutrient management plans, which include requirements to control discharges from production areas and beneficially reuse manure, litter, and process wastewater consistent with site specific nutrient management practices that ensure appropriate agricultural utilization of the nutrients on land application areas, this program should help ensure that all CAFOs manage their manure properly and protect water quality.

Discharge of Toxic Pollutants

The United States Congress, in its 1972 adoption of the Clean Water Act, stated "... it is the national

policy that the discharge of toxic pollutants in toxic amounts be prohibited" [CWA § 101(a)(3)]. The Congress in 1987 amended CWA § 303(c) requiring that each state adopt standards for any of a specific list of toxic pollutants, "...the discharge or presence of which in surface waters can reasonably be expected to interfere with the designated uses adopted by the state." These standards must be numeric criteria if such criteria have been published pursuant to CWA § 304(a). If no criteria have been published, standards must be based on biological monitoring or assessment methods. The State completed its adoption of water quality standards to meet the CWA § 303(c) requirements in 1991 and these standards were subsequently approved by EPA.

Adoption of numeric standards for toxic pollutants led to greater emphasis at both the state and federal levels on "water quality-based permitting." Water quality-based permitting, simply stated, is the development of NPDES permit limits necessary to assure that the water quality standards of a receiving stream are protected. Table 12 lists all current individual NPDES permits in New Mexico including the pollutants that are regulated in each permit and the basis of the effluent limitation. The table demonstrates the increase in water quality-based effluent limits in permits issued since the 1987 amendments to the CWA. In particular, after 1987 the number of permits with chlorine, a toxicant to fish, increases dramatically. Subsequent to the adoption of the 1991 water quality standards, the number of water quality-based limits addressing other pollutants in NPDES permits has greatly increased.

As a result of this "water quality-based" permitting strategy, the workload on both EPA and the State in proposing and certifying NPDES permits has increased dramatically. This increase is primarily due to the increased modeling of the effects of a permittee's discharge on the receiving stream (i.e., determination of potential to cause a water quality standard violation) and appeals by permittees suddenly faced with more stringent effluent limits in their renewed permits. It is expected that water quality-based permitting will continue to be controversial.

Contaminated Aquifer Remediation

The NMED underground storage tank program has identified a number of leaking underground storage tanks that have contaminated ground water several of which have also threatened surface waters. Rapid containment is often used at high-priority sites to reduce spreading of the contaminant plume, thereby protecting water supply wells, sewer collection lines, surface watercourses, homes and other structures from contamination. Containment and some remediation technologies include pumping, treating, and disposing of treated ground water. Disposal options are varied and site-specific, but may include reinfiltration, discharge to a sanitary sewer, or direct discharge to a watercourse. Recommended remediation strategies emphasize cleanup of the source area and include a variety of technologies mentioned in an earlier section of this report, many of which are *in situ* technologies.

Discharge to a sanitary sewer must be made with permission of the sewer authority which has the right to control or prohibit such discharge. The sewer authority, upon acceptance of the wastewater, becomes responsible for any effect that it might have on their system and any pollutants which 'pass through' their facility and effect the receiving stream. Some communities have elected to accept this kind of discharge conditionally, while others have expressly prohibited it.

In order to legally discharge directly to a watercourse, an NPDES permit must be secured prior to initiation of the discharge. Frequently, hydrologic containment procedures and pump tests must be initiated sooner than an individual permit can be issued. In an attempt to resolve this problem EPA issued a general

NPDES permit for this category in 1998 to allow discharge more expeditiously.

COMMUNITY WASTEWATER FACILITY CONSTRUCTION GRANTS/LOANS

The wastewater construction grants program has been phased out and grants have not been offered since December 31, 1988. Prior to this date, the State and federal governments provided grants to communities for planning, design, and construction of wastewater treatment facilities to reduce and prevent water pollution and meet enforceable requirements of the federal Clean Water Act. NMED administered this program under delegation from EPA. In conformance with EPA regulations governing federal funding for treatment plant construction, NMED prioritized construction of treatment works which more directly reduced or prevented water pollution over construction of interceptors and collection systems. NMED also administered State matching funds for the federal construction grants program as well as special State appropriations for wastewater treatment. The wastewater construction program has been replaced by the **State Revolving Loan Program**, discussed later in this chapter.

DREDGE-AND-FILL PROGRAM

Dredge-and-fill activities, such as channelization, diversion and levee building, are regulated through permit by the United States Army Corps of Engineers. A discussion of how New Mexico utilizes this program in water pollution control is presented below under the **State Nonpoint Source Water Pollution Management Program.**

Table ~~12~~4.9a. Municipal Permit List

Updated 08/26/03	NPDES	Year					Chl-	Fec																												BIO-		Chlor-	Gross		Sett	
Facility Name	**Permit #**	**Issue**	**BOD**	**TSS**	**pH**	**COD**	**orine**	**Col**	**O&G**	**NH_3**	**NO_3**	**TKN**	**P**	**Salt**	**Al**	**As**	**Ag**	**B**	**Be**	**CN**	**Co**	**Cd**	**Cr**	**Cu**	**Fe**	**H-3**	**Hg**	**Mn**	**Mo**	**Ni**	**Pb**	**Ra**	**Se**	**U**	**V**	**Zn**	**WET**	**MON.**	**D.O.**	**dane**	**alpha**	**Temp**	**Sols**	**Other**
Albuquerque	NM0022250	1994	■	■	■		●	●		●	●				●	●	●			●																●		●						
Abiquiu	NM0024830	2002	■	■	■		●	♦																																			
Alto de las Flores	NM0028819	2001	■	■	■		●	♦																																			
Anthony	NM0029629	2002	■	■	■		●	♦							●	❍		❍		●				●			●						●					❍						❍
Artesia	NM0022268	2001	■	■	■		●	♦							●					●				●			●						●					❍						
Aztec	NM0020168	1999	■	■	■		●	♦						❍																								❍						
Bayard	NM0020231	2002	■	■	■		●	♦																																			
Belen	NM0020150	2002	■	■	■		●	♦																❍														❍		●				●
Bernalillo	NM0023485	1988	■	■	■			♦																																			
Bloomfield	NM0020770	2000	■	■	■		●	●						❍																								❍						
Bosque Farms	NM0030279	2000	■	■	■		●	♦		❍																											●							❍
Carlsbad	NM0026395	2002	■	■	■		●	●																			❍									●							
Chama	NM0027731	2002	■	■	■		●	♦		❍					❍																							❍						
Cloudcroft	NM0023370	2003	■	■	■		●	♦																																			
Cuba	NM0024848	2002	■	■	■		●	♦																																			
Espanola	NM0029351	2001	■	■	■		●	●		●					●		●					●	●				●											❍	●	●				●
Farmington	NM0020583	1999	■	■	■		●	●						❍	●																							❍						
Fort Sumner	NM0023477	2002	■	■	■		●	♦							❍			●																				❍						
Gallup	NM0020672	2000	■	■	■		●	♦						❍																													
Hatch	NM0020010	2000	■	■	■		●	♦																														❍						
Jemez Springs	NM0028011	1985	■	■	■			♦																																			
Las Cruces	NM0023311	2000	■	■	■		●	♦							❍					●				❍								❍				●							❍
Las Vegas	NM0028827	2000	■	■	■		●	♦		❍																												❍						
LA Co White Rock	NM0020133	2001	■	■	■		●	♦																																			
LA Co Bayo	NM0020141	2000	■	■	■		●	♦																			●											❍						
Los Lunas	NM0020303	2002	■	■	■		●	♦		❍																												❍						
Maxwell	NM0029149	2003	■	■	■		●	♦																																			
Mora	NM0024996	2002	■	■	■		●	●																																			
Pecos	NM0029041	2003	■	■	■		●	●																														❍						
Ramah	NM0023396	2002	■	■	■		●	♦						❍																													
Raton	NM0020273	2001	■	■	■		●	●																														❍						
Red River	NM0024899	2000	■	■	■		●	♦							●																							❍						
Reserve	NM0024163	2001	■	■	■		●	♦																																			
Rio Rancho #2	NM0027987	1990	■	■	■		●	♦		■					❍	❍	❍	❍	❍	❍	❍	❍	❍	❍			❍				❍	❍	❍		❍	❍		❍	❍	❍				❍
Rio Rancho #3	NM0029602	1988	■	■	■			♦																																			
Roswell	NM0020311	2001	■	■	■		●	♦																			❍											❍						
Ruidoso	NM0029165	2001	■	■	■		●	♦					●							●							●								❍			❍						
Salem	NM0030457	2002	■	■	■		●	●		●																																	
San Miquel Co.	NM0028363	2001	■	■	■		●	♦																																			
Santa Fe	NM0022292	2001	■	■	■		●	♦		●	●																											❍	●					
Santa Rosa	NM0024988	2003	■	■	■		●	●																														❍						
Silver City	NM0020109	2000	■	■	■			♦																			●								●									
Socorro	NM0028835	2001	■	■	■		●	♦																														❍						
South Central Reg	NM0030490	2003	■	■	■		●	●																														❍						
Sunland Park	NM0029483	2002	■	■	■		●	♦		❍					●												●											❍						
Taos	NM0024066	2001	■	■	■		●	♦																														❍						
T or C	NM0020681	2000	■	■	■		●	●																														❍						
Tucmcari	NM0020711	2002	■	■	■		●	♦																																			
Taos Ski Valley	NM0022101	2000	■	■	■		●	♦		●			●																									❍						

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■ = Indicates a technology based effluent limitation (BPT/BAT or BPJ)

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BOD = Means either Biochemical Oxygen Demand (5 day) or Carbonaceous Biochemical Oxygen Demand (5 day).

COD = Chemical Oxygen Demand

Chlorine - Note most water quality based effluent limits are "total residual chlorine." Some technology based limits are "free available chlorine."

O & G = Oil and Grease

WET = Whole Effluent Toxicity Limitation

Salt = Per policies established by the Colorado River Basin Salinity Control Forum.

Ra = generally means Ra 226 + 228 but some permits require only Ra 226

Other = this category covers uncommon parameters (e.g., sulfite that occurred in only one permit or as in some cases requirements to analyze a number of organic pollutants).

Table ~~12~~4.9b. Industrial Permit List

Facility Name	NPDES Permit #	Year Issue	BOD	TSS	pH	COD	Chl-orine	Fec Col	O&G	NH_3	NO_3	TKN	P	Salt	Al	As	Ag	B	Be	CN	Co	Cd	Cr	Cu	Fe	H-3	Hg	Mn	Mo	Ni	Pb	Ra	Se	U	V	Zn	WET	BIO-MON.	D.O.	Chlor-dane	Gross alpha	Temp	Sett Sols	Other
Ariz. Pub. Serv.	NM0000019	2001		■	■		■		■					❍										■	■																				■
Bloomfield Sch.	NM0028142	2000	■	■	■		●	●						❍																								❍					■		
Cannon AFB	NM0030236	2000	■	■	■		●	♦																													❍							
Cent. Cons. Sch.	NM0029319	2000	■	■	■		●	♦																													❍							
Cent. NM Correction	NM0028851	2001	■	■	■		●	♦																																				
Chino Mines	NM0020435	2000	■	■	■										●	●		●			●	●	●	●			●		●		●		●	●	●		●	●							■
Delta Person	NM0030376	2000			■		●			❍													■																						■
El Paso Electric	NM0000108	2001	■	■	■		■	♦	■															●									●					❍				■		■
Farm. Anim. Stm.	NM0000043	2000		■	■				■					❍																												■		
Farmington S&G	NM0028258	2000		■	♦									❍																														B
Four Corners Materi	NM0027995	2001		■	■									❍	●																							❍							
Gadsden School	NM0028487	2003	■	■	■		●	●																													❍							
Glorieta Con. Cen.	NM0028088	2002	■	■	■		●	●	■																													❍							
Harper Valley	NM0029025	2000	■	■	■		●	♦						❍																								❍							
Holloman AFB	NM0029971	2000	■	■	■		●	♦																													❍							
GCC Rio Grande	NM0000116	2000		■	■				■						●			●						●			●		●															■		B
Jemez Val. School	NM0028479	1985	■	■	■			♦																																				
Lee Ranch Coal	NM0029581	2000	■	■	■		●	♦																	■			■																■	
Los Alamos Nat.	NM0029637	1987		■	■		●																																					
DOE/UC - LANL	NM0028355	2001	■	■	■	■	●	♦	■				■		●	●		●			●	●	●	●	■	●	●			●	●	●	●		●	●							■
P&M York Canyon	NM0000205	2002			■										●	●									■					●			●		●					●	●				●
Las Vegas WTP	NM0030341	2001		■	■										❍																													
Molycorp	NM0022306	2001		■	■	■	●								●	■			❍	●		●		●	■		●	■	■		●					■		❍				●			■
Mora Ntl. Fish	NM0030031	2001		■	■					❍																												❍				❍	■	
NM Firefighter Acad	NM0029726	2002	■	■	■	❍	●	♦	■							❍	❍		❍	●	❍	❍	❍	❍			●			❍			●		❍	❍					❍				●
NMGFD Parkview	NM0030139	2001		■	■					❍																												❍					❍	■	
NMGFD Glen.	NM0030163	2001		■	■					●	❍	❍	❍																									❍					❍	■	
NMGFD Rock	NM0030155	2001		■	■					❍																												❍					❍	■	
NMGFD Sev. Spr	NM0030112	2001		■	■					❍																												❍					❍	■	
NMGFD Lisboa	NM0030121	2001		■	■					❍																												❍					❍	■	
NMGFD Red Riv.	NM0030147	2001		■	■					❍																												❍					❍	■	
NMPRD E. Butte	NM0024937	2001	■	■	■		●	●																																				
LAC Minerals	NM0028711	2000			■																													●							●				
P&M Ancho	NM0030180	2002			■										●										■									●		●					●			
P&M Cimarron	NM0029459	2000			■																●													●									■	
PNM Algadones	NM0000132	2001		■	■		■																															❍							
Pojoaque Terr.	NM0028436	1987	■	■	■			♦																																				
PNM Person	NM0030384	2001			■			♦												●																								●
PNM Reeves	NM0000124	2003		■	■		●		■											❍				●			❍							❍				❍					■		❍
PNM San Juan	NM0028606	2000		❍	❍		❍		❍		❍		❍		❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍		❍	❍	❍		❍		❍			❍	No discharge is allowed (see footnote)						❍
Rio Algom	NM0020532	2000		■	■	■																											■	●	■	●	■							
Rancho Ruidoso	NM0029238	2002	■	■	■		●	♦																																				
Raton Pub. Serv.	NM0026522	2001		■	■		■		■															■	■																			
Reddy Ice	NM0030228	2002			■		●																																					
Rio de Arenas	NM0027375	2001	■	■	■		●	♦																																				
Rio Grande Res.	NM0028100	2000	■	■	■	■		♦							●			●			●	●	●	●			●		●		●	■	●	■	●	■					●			
NM Water Serv Rio	NM0027782	2002	■	■	■		●	♦		❍																												❍							
NM Water Valencia	NM0030414	2001	■	■	■		●	♦							●																													
Ranchland Util	NM0030368	2001	■	■	■		●	♦																																				
Raton Drinking	NM0027891	2001		■	■		■																																					
Ruid.WTP Alto	NM0028533	2001		■	■																													●										
Ruid. Grindstone	NM0030392	2000			■																																							
Sacramento Meth.	NM0028886	2001	■	■	■		●	●																																				
Salt Lake Project Fe	NM0030244	2002		■	■										●	●		●			●	●	●	●	■		●				●		●		●	●						■		●
San Juan Coal	NM0028746	2001	■	■	■	■	●	♦	■					●	●	●	●	●	●	●	●	●	●	●	■		●		●		●	●	●		●	●		❍		●	●	■		■
San Juan Coal	NM0029505	2001		■	■																				■			■					●										■	
San Juan County M	NM0030473	2002	■	■	■		●	●																													❍							
Sandia Peak	NM0027863	2002	■	■	■		●	♦																																				
Santa Fe Water	NM0030465	2001		■	■				■																																			
St. Cloud Mining	NM0029050	2002		■	■											●	❍	●			●	●		●	●			●			❍	●		●		●	●				●	●			●
Southwest. Pub	NM0029131	2002			■		■														❍																						■		
Santa Teresa	NM0030201	1995	■	■	■		●	♦																			●											❍							
Uranium King	NM0028169	2000	■	■	■	■		♦														●					●					■	●	■	●	■				●				■
Utah International	NM0028193	2000		■	■									❍											■			■															■	
Valle Vista	NM0028614	2001	■	■	■		●	♦																																				
Yampa Gateway	NM0029475	2000			■									❍	●	●		●		●	●	●	●	●			●				●	●	●		●	●				●		■	■
Yampa De Na Zin	NM0029432	2000			■									❍	●	●		●		●	●	●	●	●			●				●	●	●		●	●				●			■

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BIA Crystal Sch.	NM0020869	1998	■	■	■			♦																																				❍	
BIA Ft. Wingate	NM0020958	1999	■	■	■			♦						❍																														
BIA Jicarilla	NM0026751	1989	■	■	■		●	♦						❍																														
BIA Lake Valley	NM0021016	1998	■	■	■			♦						❍																														
BIA Nenahnezad	NM0020800	2000	■	■	■			♦						❍																														
BIA Pueb. Pintado	NM0020991	1998	■	■	■			♦						❍																														
NTUA Navajo	NM0020613	1998	■	■	■			♦																																		❍	
NTUA Shiprock	NM0020621	2001	■	■	■		●	♦						❍																									●					
NTUA Crownpoint	NM0020630	2001	■	■	■			♦						❍																														
Mescalaro School	NM0030481	2003	■	■	■		●	●																																			

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Chlorine - Note most water quality based effluent limits are "total residual chlorine." Some technology based limits are "free available chlorine."

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Salt = Per policies established by the Colorado River Basin Salinity Control Forum.

Ra = generally means Ra 226 + 228 but some permits require only Ra 226

Other = this category covers uncommon parameters (e.g., sulfite that occurred in only one permit or as in some cases requirements to analyze a number of organic pollutants). A "B" indicates BMP requirements.

PNM San Juan (NM0028606) This permit requires "no discharge allowed" however it also provides that if there is an unexpected discharge it must be monitored.

Spill Cleanup

The State spill cleanup regulation, §1203 of the WQCC Regulations, requires prompt notification to NMED or, as appropriate, the New Mexico Energy, Minerals and Natural Resources Department's Oil Conservation Division (OCD) of any unpermitted discharge or spill potentially affecting ground or surface water. This regulation also requires the discharger to take corrective action to remediate the problem. Section 1203 is routinely employed to effect cleanup of spills to surface water, often in conjunction with § 2201 of the regulations, which prohibits disposal of refuse in a watercourse.

Discharges to Surface Waters

State regulations for discharge to surface waters (Subpart II) are another mechanism for surface water pollution control. These regulations set discharge limits for biochemical oxygen demand, chemical oxygen demand, settleable solids, fecal coliform bacteria, and pH. The WQCC has, to date, determined that the federal NPDES permit program will be the primary mechanism for regulating point source discharges to surface waters in New Mexico. The WQCC has historically opposed the 'dual regulation' that would occur if the State were to have a separate State discharge permit. Accordingly, the WQCC regulations apply to discharges with an NPDES permit only if the discharger has not corrected violations of NPDES permit limitations within thirty days after receipt of written notification of such violations from EPA. The State regulations are also the means for regulating dischargers who have applied for but have not yet been issued NPDES permits and dischargers with expired NPDES permits who have not yet applied for renewal.

~~A general permit was issued by the EPA in 1993 which controls discharges from concentrated animal feeding operations in New Mexico. Under the federal permit, no discharges are allowed except during certain major rainfall events. This permit requires the retention and proper disposal of wastewater and contaminated runoff from large cattle and dairy feeding operations, as well as horse, swine, and poultry feeding operations and other large concentrated animal feeding operations. Currently there are approximately fifty~~

~~facilities permitted under the EPA's general permit.~~

Utility Operator Certification and Facility Operations

Regulations for classification of utility systems and certification of utility operators (20.7.4 NMAC) were adopted by the WQCC in 1974 and subsequently amended in 1993 and 2001 in response to the requirements of the New Mexico Utility Operators Certification Act (§§ 61-30-1 et seq., NMSA 1978). The regulations classify public water and wastewater utility systems according to the population served and technical complexity of the utility system. These regulations require that operators be certified at appropriate levels of proficiency, depending upon system classification. The WQCC has assigned responsibility for implementing the Certification Act to NMED. The program receives general guidance from the New Mexico Utility Operators Certification Advisory Board.**Certification**

Over ~~2,100~~ **2,350** water and wastewater operators were certified by NMED in ~~2001~~**2002**. Because many operators hold both water and wastewater certificates, over ~~2,800~~**3,200** certificates are in effect today. Over ~~1,000~~**1,200** examinations for certification and recertification given on an annual basis in ~~2000 and~~ 2001 **and 2002**. Approximately 1,800 public water and wastewater utilities are required to have certified operators. Working with the Utility Operators Certification Advisory Board and panels of operators, supervisors and trainers from around the State in ~~2000 and~~ 2001 **and 2002**, NMED is updating the criteria documents used to guide operator training and validate examinations for all levels of utility operator certification.**Training Activities**

Through **the decrease in** funding under the federal Safe Drinking Water Act, the CWA, and the State Water Conservation Fund Act, statewide training activities have ~~increased~~ **decreased** in the past few years. NMED assists the various training providers in the State in planning efforts to improve operator training availability and quality. NMED has also continued to fund the New Mexico State University Water Utilities Technical Assistance Program. This program conducts specialized workshops in the various geographic regions of the State and provides technical assistance to operators' "short schools" sponsored by the

New Mexico Water and Wastewater Association. The program also provides essential on-site technical outreach assistance and consultation for the resolution of municipal water and wastewater facility problems related to operations. In ~~2000 and~~ 2001 **and 2002**, NMED continued its productive coordination with this training program in both the performance of diagnostic inspections and the provision of technical assistance.NMED reviews and approves training toward operator certification requirements, based on criteria adopted by the Advisory Board. Slightly more than 40,000 trainee contact hours were reported to NMED during ~~2001~~**2002**. NMED staff also participate in and conduct several training sessions offered throughout the year.**Facility Operations**

NMED reviews the operations and maintenance manuals prepared for new wastewater projects funded through the federal and State programs administered by the NMED Construction Programs Bureau. These reviews help ensure that the project's consulting engineer has provided necessary training for facility personnel, that each community will be informed of applicable State and federal water pollution control laws and its responsibility as a grant recipient to comply with these laws, and that staffing plans will be adequate for the size and complexity of the facility.

NMED has participated in several operations and management evaluations in conjunction with EPA since 1986. These inspections are conducted to evaluate NPDES permit compliance as well as the operations, maintenance and financing of wastewater facilities built with federal and State funds. In recent years, NMED has taken a lead role in these evaluations in an effort to address the inadequate operations and maintenance of wastewater treatment facilities. Such inadequacies are often a major factor in permit noncompliance.

Enforcement

In ~~2000 and~~ 2001 **and 2002**, compliance surveys were conducted on approximately ~~350~~ **480** public water and wastewater facilities. Of these, a majority were found to be in compliance with the Utility Operator Certification Regulations. About half the cases of non-compliance and marginal compliance are tempo-

rary, and are caused by the movement of certified operators from one facility to another.

Facilities found to be below necessary staffing are allowed to operate under negotiated compliance schedules designed to bring them into total compliance by specified dates. NMED is currently monitoring voluntary compliance schedules with several communities found to be noncompliant in surveys conducted in ~~2000~~**2001**. These systems include municipal, privately owned, as well as State and federal facilities.

EPA has included operational and staffing deficiencies as items which must be rectified under its administrative orders issued against noncompliant NPDES permittees. This has allowed compliance with State certification requirements to be incorporated directly into enforcement actions designed to address instances of poor permit performance resulting from unsatisfactory facility operations.

Future Directions and Needs

In 2001, the legislature amended the Utility Operator Certification Act and the Water Quality Control Commission subsequently modified the program regulations to conform with national standards contained in the *Guidelines for the Certification and Recertification of the Operators of Community and Nontransient Noncommunity Public Water Systems*, as adopted by EPA in 1999. These changes included minor alterations to the regulations, and complete documentation of policies and procedures. Additional improvements to operator training quality and availability are needed to assure public water and wastewater utility operators are well qualified. **In 2002 the New Mexico Environment Department (NMED) has developed proposed amendments to the Act that will be introduced during the 2004 New Mexico legislative session. The amendments improve NMED's ability to consistently apply the provisions of the Act. The amendments also propose changes to the current fee structure so that fees collected from operators are used to support programmatic functions of the certification program.**

State Revolving Loan Program

Through enactment of the Wastewater Facility Construction Loan Act (§§ 74-6A-1 et seq., NMSA 1978), which was signed into law in 1986, the New Mexico Legislature created a revolving loan fund. The

purpose of the Loan Act "is to provide local authorities in New Mexico with low-cost financial assistance in the construction of necessary wastewater facilities through the creation of a self-sustaining revolving loan program so as to improve and protect water quality and public health." Regulations (20 NMAC 7.5) pursuant to the State Loan Act have been adopted by the WQCC. In addition, the State has developed policy, procedures, guidelines, and a priority ranking system for use in administration of the State loan program.

The revolving loan fund is administered by NMED. State money appropriated to the Department to carry out the provisions of the Loan Act (i.e., loans to local authorities) may be used to match federal funds allocated to New Mexico pursuant to the CWA. Federal capitalization grants and loan principal and interest repayments are deposited into the fund. Proposed construction projects are prioritized and then funded based on the availability of federal and State funds. In ~~1993~~ **2000** the WQCC lowered the base interest rate for new loans to ~~4~~**3**%, and included provisions for ~~3~~**2, 1 and 0**% ~~interest and 0%~~ interest loans for hardship communities which meet certain criteria. ~~The base interest rate for Fiscal Year 1998 remains four percent.~~

New Directions: Loans under this program are now available to assist local governments and other sub-state entities which implement BMPs to protect water quality from nonpoint source impacts. NMED is developing procedures to include nonpoint source and Brownfields type projects, along with point source projects, on an integrated priority list for loan funding.

Colonias Wastewater Construction Grant Program

One of the more serious environmental concerns facing New Mexico is along its southern border with the Republic of Mexico. Rapid industrial growth driven by unprecedented trade opportunities, along with burgeoning concentrations of people in the neighboring large cities of Ciudad Juárez, Mexico and El Paso, Texas, have created serious conditions in nearby New Mexico. Congestion, uncontrolled urban development, and lack of basic environmental health and sanitation facilities have become significant problems in many communities on both sides of the border.

In the United States, many unincorporated communities or settlements, called colonias, have sprung

up adjacent to established towns and cities along the border. Colonias are home to several hundred-thousand people in Texas and at least 40,000 in New Mexico. They are characterized by substandard housing, inadequate roads and drainage, and inadequate or non-existent environmental infrastructure systems such as potable water supplies or regulated wastewater treatment facilities. Currently less than seven percent of New Mexico's colonias are served by licensed and monitored wastewater treatment systems. The rest of the colonias are served by on-site cesspools, septic tanks with leach fields or outhouses. Approximately 20% of the colonias in New Mexico have no water supply systems.

Many of the colonias were originally settled over 200 years ago and represented established and stable communities. However, the rapid growth and development in the border area over the last two decades has brought significant change to the population dynamics of the region. The majority of current colonia inhabitants are first and second-generation low-income migratory families of Mexican descent. Parts of six New Mexico counties are within the 100 kilometer (62-mile) designated border area. This includes Otero, Doña Ana, Sierra, Luna, Grant and Hidalgo counties. Many colonias, with their concentrations of people and concurrent health and environmental concerns, occur along the 44-mile stretch of the Rio Grande Valley from Las Cruces to the El Paso/Ciudad Juárez metropolitan area. Another cluster of colonias is around Hatch. North Hurley, near Silver City, also qualifies as a colonia.

The State of New Mexico through NMED is addressing part of the complex colonias issue with the administration of two federal grant programs provided through the EPA. The Colonias Wastewater Treatment Construction Grant Program brings up to $10-million into the border region for planning, construction or improving facilities which serve New Mexico's colonias. The program is eligible to any identifiable unincorporated community, or a county, municipality, district or other political subdivision of the State acting on the behalf of a colonia. To be eligible, a community must be situated within a hundred kilometers of the United States-Mexico border, be designated by the State or county in which it is located as a colonia on the basis of objective criteria, including lack of an adequate potable water supply, lack of adequate sewage sys-

tems and lack of decent, safe and sanitary housing, and be able to prove that it was in existence before November 28, 1990.

STATE ENFORCEMENT

In recent years the State has taken fewer surface water enforcement actions against larger NPDES permittees than in the past for two principal reasons. First, fewer facilities require enforcement, as the construction grants program and State special appropriations have funded new wastewater treatment plants or major modification for most of the communities in New Mexico. While the grant program has been phased out and replaced by a revolving loan program, the program was very successful in correcting many of the problems which led to noncompliance. Secondly, EPA has improved enforcement of its NPDES permit program. Consequently, rather than duplicate effort, NMED now places more emphasis on assisting EPA with its enforcement program.

State enforcement may be an administrative or a judicial action. Administrative enforcement may be through an 'assurance of discontinuance' negotiated between the State and the discharger who is in violation of WQCC regulations. An assurance typically sets forth actions a discharger must take and a timetable for achieving compliance with the regulations. An assurance may also contain interim effluent limitations covering a specified time period. An assurance of discontinuance must be formally approved by the WQCC. In 1993 the New Mexico Legislature amended the New Mexico Water Quality Act. Among the many amendments, enforcement powers were increased by establishing administrative penalty provisions, higher maximum financial penalties and criminal provisions.

Judicial action involves court proceedings. The judicial means commonly used are "stipulated judgements" and "judgement by consent" whereby the terms of the judgment are negotiated between NMED, on behalf of the WQCC, and the discharger as approved by the State District Court. NMED has also negotiated out-of-court settlement agreements. The State could also file a Citizen's Suit pursuant to CWA § 505 to enforce an NPDES permit.

Present and Emerging Concerns

In recent years the State's surface water enforcement problems have been primarily in the area of illegal disposal of refuse in a watercourse. This includes the deposition of trash, septage disposal, and solid waste.

Septage disposal and disposal of other wastes hauled by vacuum trucks continue to be a problem statewide. The 1989 New Mexico Solid Waste Management Regulations (~~12~~NMEIB 1995) banned disposal of liquids in solid waste landfills. Illegal disposal in watercourses of materials commonly carried by septage disposal companies continues to be a concern. Another problem regarding septage disposal in New Mexico may result from EPA's recent technical sludge management regulations. EPA's new technical regulations consider land application of septage to be a form of disposal only, and require treatment in addition to land application. Strict implementation of EPA's proposed technical regulations further compounds the problem of illegal septage disposal by adding the new dimension of federal requirements.

The discharge of raw sewage from sewer collection lines that break or overflow due to poor maintenance or location continues to be of great concern. NMED frequently receives reports that raw sewage entered a stream when a sewage collection line broke. These breaks often could have been prevented by better siting or through a maintenance program which would have identified the potential problems. In recent years, some communities have made considerable progress in minimizing the number and severity of their overflows. For example, the City of Farmington, in response to NMED's increased attention to spills, installed high water alarms with telemetry capabilities at critical places in the collection system. These preventative devices and the increased sewer line maintenance were a direct response to regulatory attention.

The amendments to the spill reporting requirements of WQCC regulations (§ 20.6.2.1203 NMAC), effective in December 1987, have resulted in increased awareness and reporting of spills. Due to these amendments, NMED is now better able to address spills because it can include a prevention program as part of the required corrective action report. Thus, corrective action may not only include an immediate fix but a

longterm plan to correct underlying causes of failure such as maintenance or location.**THE STATE NONPOINT SOURCE WATER POLLUTION MANAGEMENT PROGRAM**

The New Mexico Nonpoint Source Management Program was first adopted by the WQCC and approved by the Governor prior to submittal to EPA on September 12, 1989. The program was subsequently approved by EPA on September 26, 1989. The revised and updated program was recently approved ~~by EPA~~ in January ~~2001~~ **2004 by the WQCC**~~(13)~~.

Since first approval of the program, as the lead nonpoint source (NPS) management agency for New Mexico, NMED has coordinated largely voluntary efforts and activities within the State through the Surface Water Quality Bureau (SWQB), and has made significant progress in reducing known NPS pollution concerns while promoting pollution prevention on a broad scale.

The Nonpoint Source Management Program contains a series of implementation milestones which were designed to establish goals while providing a method to measure progress and success of the program. Implementation itself consists of extensive coordination of efforts among NPS management agencies, promotion and implementation of best management practices, coordination of demonstration projects and watershed projects, inspection and enforcement activities, consistency reviews and education and outreach activities.

Best Management Practices

Nonpoint source controls are typically established through the implementation of management practices which can be either structural or nonstructural in nature. Structural practices can be represented by diversions, sediment basins, animal waste lagoons, fencing for the management of livestock, terraces, rock check dams or other constructed means of reducing impairments to surface and ground waters. Nonstructural practices are thought of as conservation practices related to the way in which we manage our resources. These nonstructural practices can be represented by the timing and rate of fertilizer and pesticide applica-

tion, conservation tillage methods, and rotation of cattle on grazing areas, riparian plantings and other strategies. Best management practices should realistically represent the best combination of structural and/or nonstructural management practices working together to reduce impairments to water quality. These BMPs should be developed based on the site-specific conditions where the practices are to be constructed and/or implemented, and should be selected based on the economics and goals associated with the specific problem to be addressed. As BMPs are selected for a specific application, many sources of technical information are available to assist in the selection, design and implementation.

Under ideal situations, the process provides for the protection of water quality. As with any form of pollution control measure, the benefits gained are directly associated with the degree of thought, analysis and care given to the process of selection, design, implementation, maintenance, and management.

Nonpoint Source Management Program Activities

The New Mexico NPS Program contains elements which are both statewide and watershed oriented. Since many NPS issues within the State are of such widespread concern, a number of efforts and activities must be coordinated on a statewide basis. Likewise, many issues which are of critical concern are extremely localized within specific watersheds, and therefore are addressed on a watershed-by-watershed basis.

Statewide Efforts

Nonpoint source pollution is directly related to land use practices on a broad geographical scale. In New Mexico, the principal sources of NPS pollution include agriculture, ranching, silviculture, resource extraction, hydromodification, recreation, road construction and maintenance, and on-site liquid waste disposal. Reduction in pollutant delivery from these sources is controlled or prevented through the implementation of BMPs by the responsible party. New Mexico encourages the use of BMPs for the control of NPS pollutants through a combination of efforts including incentive programs, education and outreach activities. Statewide efforts to control or reduce the degree of water quality impairments utilizes a combination of these techniques and are discussed below in the appropriate NPS category.

Agriculture

New Mexico's crop production includes irrigated and nonirrigated activities. The impact on water quality from each of these agricultural sources varies regionally across the State. These variations are mainly due to widespread differences in suitability for each type of production. Current statewide efforts focus on providing enhanced protection of water quality with these differences in mind.

Irrigated agriculture can affect water quality through the diversion of water from natural systems as well as through the discharge of return flows. Diversion from streams is known to completely dry up reaches of streams in several areas in New Mexico resulting in the destruction of the aquatic biota. In addition, both irrigated and nonirrigated crop production can adversely affect water quality through the discharge of storm water following precipitation events.

Primary programs for control of NPS impairment from agriculture are coordinated through the United States Department of Agriculture. The majority of those efforts represent incentive programs which provide information, technical assistance and financial assistance to agricultural producers within the State. These sources include the Natural Resources Conservation Service, formerly known as the Soil Conservation Service, which provides technical assistance related to the design and planning of practices and structures, and the Farm Service Agency, which provides financial assistance for the implementation of BMPs. Additionally, the New Mexico Soil and Water Conservation Commission provides recommendations to the Secretary of Agriculture for projects and programs through the Soil & Water Conservation Districts for producers to implement BMP's. Additional sources of funding and assistance for implementation of BMP's come from the Soil & Water Conservation Districts through mil levy referendums; distribution of county funding from the Farm & Range Improvement funds; administering federal, state, local and private foundation grants; low-interest loan programs for irrigation improvements from the Interstate Stream Commission; and providing equipment and tools. CWA § 319 appropriations are now funding many of these programs throughout the State.

The New Mexico Cooperative Extension Service also provides significant assistance to agricultural producers through its education and outreach programs. Many of the programs provided through the Extension Service are now oriented toward the protection and improvement of water quality. One such program, FARM*A*SYST, is designed to provide producers with a tool to make assessments of environmental concerns on the farmstead and provide alternative methods of management designed to benefit water quality.

Rangeland Agriculture

In New Mexico rangeland NPS pollution in the form of turbidity and siltation is often the product of natural conditions associated with arid land climates. Most of New Mexico receives 15 inches or less of annual precipitation on highly erodible soils. This precipitation typically arrives in July and August in the form of torrential downpours following two to three months of little to no rainfall. Scarce vegetation in the form of grasses and forbs allows overland flows to strip soils from the surface.

Progress continues to be made in the area of grazing management as ranchers and State/federal allotment permittees become increasingly aware of the ecological importance of riparian areas. Although many operators continue to feel threatened by the plethora of regulation surrounding water quality and riparian related species, many now recognize that what is good for riparian areas is also good for production. Grazing management trends point to multiple-pasture rest rotation grazing systems which often include special protection for riparian areas. This type of active management, whereby cattle are frequently moved from pasture to pasture, has proven to be a reliable path to success. Riparian and upland watershed conditions often exhibit rapid improvements under this type of system.

Another issue facing the ranching community is the ever-shrinking size of suitable grazing land due to an accelerated encroachment by woody species (piñon and juniper). This phenomenon is generally thought to be a direct result of the interrupted natural fire cycle which used to occur in the southwest United States. Some progressive ranchers have begun to reverse this trend by removing woody species and reintroducing fire into the ecosystem, the results of which have proven to be positive to both water quality and

quantity. Most within the ranching community recognize that the longterm sustainability of the ranching in New Mexico depends on an environmentally sensitive and active management approach. In fact, many bear witness to the fact that their ranches are thriving under these types of systems. In the words of one such rancher, "...this environmentalism is making me money."

Efforts to reduce rangeland NPS pollution have focused on grazing practices instead of vegetation management. Reduction of livestock numbers in recent decades and the implementation of grazing BMPs have had little to no effect on grazing lands NPS pollution. The recognition that a reduction in livestock numbers has brought little to no improvement has prompted a reevaluation of the source of NPS pollution on grazing lands.

Fire suppression allowing woody plant species invasion is the primary cause of surface erosion in the woodland and lower elevation grasslands. In the ponderosa pine forests, fire suppression has fostered an increase in tree densities from 19 to 50 trees per acre to highs of 3,000 trees per acre resulting in an average of 30% reduction of surface flows and restriction of infiltration to ground waters. At lower elevations, shallow lateral roots extending three to four plant radii beyond the drip line of piñon and juniper trees intercept precipitation as it infiltrates. The evergreens are able to utilize precipitation during most of the year, leaving the soil relatively dry when the growing season for grasses begins. The result is bare ground between the trees that is subject to increased erosion during intense summer thunderstorms.

In the early 1980s, the Soil and Water Conservation Division promulgated BMPs designed to address the issues of woody invasion, diminishing grasses and forbs, reduction of surface flows and groundwater recharge. Federal and State land management agencies have not successfully implemented many of these BMPs.

The Soil and Water Conservation Commission and Districts have identified watershed restoration as the number one priority for New Mexico.

Silviculture

Larger-scale commercial timber harvesting on USFS-managed lands has been effectively halted due to continuing litigation. The only silvicultural activities presently occurring are primarily associated with personal use (fuelwood and fenceposts), habitat/watershed improvements (thinning), fire salvage logging, and urban interface/fire protection.

The New Mexico Forestry and Resource Conservation Division of the Energy, Minerals and Natural Resources Department continues to operate voluntary and regulatory programs which are directed toward the use of BMPs for silvicultural activities on State and private lands.

Areas on Forest Service Lands identified by the USFS as suitable for timber harvesting occupy roughly 10% of the forested lands. Pre-1990 harvesting activities were disturbing about one half of one percent of those lands. BMPs were modified at that time to reduce impacts to water quality. Fire suppression on all Forest Service lands over the last 100 years has created conditions that favor large scale catastrophic wild fires and an average 30% reduction of high quality water delivery.

These reductions of water delivery from the watersheds has also contributed to exceedence of water quality standards in the lower reaches of New Mexico's rivers. As the flows of higher quality water is reduced, numeric concentrations of point and non point source pollutants increase. Soil and Water Conservation Districts (SWCD) serving areas of forested lands have engaged in extensive public outreach and education about these conditions and the need of reintroduction of fire into the ecosystem. SWCD are also soliciting partnerships with the USFS, BLM and permittees to reduce fuel loading and tree densities in an effort to restore stream flows, enhance riparian regeneration and reduce non point source pollution.

Resource Extraction

Historical resource extraction issues have been difficult to address in New Mexico due to the nature of regulatory requirements that have been in existence. Many of the inactive and abandoned sites were not subject to much scrutiny by NMED or other State regulatory agencies prior to the development of the Non-

point Source Program. In addition, the New Mexico Mining Act (NMMA) rules which went into effect in July of 1994 require the reclamation of all land disturbing activities at mines which operated for at least two years after 1970. This should contribute to the mitigation of the impacts of mining activities on water quality.

Hydromodification

The SWQB issues the CWA § 401 Water Quality Certifications for CWA § 404 Dredge-and-Fill activities throughout the State. Individual, Regional and Nationwide permit activities are reviewed for consistency with the NPS program and for the protection of water quality standards. SWQB staff review dredge-and-fill applications to ensure that applicants are using BMPs to protect water quality. This review process includes providing comments to agencies and individuals during planning of the projects to ensure proper water quality concerns are taken into account early in the process. Following a review process, SWQB issues unconditional certification, conditional certification, or denies certification as appropriate. SWQB rarely issues unconditional certification. Unconditional certificates are issued for nationwide permits in ephemeral systems, hazardous waste cleanup and oil spill cleanup. For the majority of all nationwide permits, individual certification must be obtained. Conditions are added to the certifications to ensure maintenance of water quality standards. This change has greatly enhanced the capability to protect water quality by requiring specific practices for those activities. In those cases where BMPs have not been implemented and water quality standards violations have occurred, the State takes steps to ensure that mitigation efforts are initiated. Enforcement activities are undertaken only as a last resort to ensure compliance with State water quality standards.

Recreation

Recreation in New Mexico is an important industry which serves both residents and visitors from throughout the United States as well as from other nations. Hiking, picnicking, camping, fishing, hunting, biking, outdoor photography, off-road vehicle use, whitewater boating, and skiing attract many people to

both developed and undeveloped recreational areas throughout the State. Many of the recreational areas exist on public lands administered by the BLM, BOR, USFS and the New Mexico State Parks (NMSP).

As the population increases, recreational land uses and associated impacts also increase. Nonpoint source problems associated with recreation include erosion, loss of riparian vegetation, streambank destabilization, runoff from roads, parking lots, trails and other developed areas, and on-site waste disposal. The USFS, BLM and NMSP have taken steps to reduce NPS impacts from many of their developed recreation areas through the relocation of use areas away from waterbodies, riparian plantings, the repair and maintenance or closing of roads, and the control of erosion.

The SWQB continues to address NPS impacts from recreation through federal consistency review and several CWA § 319 projects.

Road Construction And Maintenance

NMED continues to cooperate with the New Mexico State Highway and Transportation Department (NMSHTD) to provide for the increased awareness of water quality concerns related to road construction and maintenance and to provide for the increased utilization of BMPs. As a result of training provided by the SWQB and the signing of a Memorandum of Understanding in 1995 between NMED and NMSHTD, an expanded program of sound BMP implementation at road construction and maintenance sites has developed. The SWQB participates in the planning phases of Federal Highway Administration road projects that have the potential to impact surface waters. This participation can result in changes to road alignment and design that are protective of surface water quality.

The USFS and BLM's continuing efforts to close, relocate, or rehabilitate roads has as improved watershed conditions and helped reduce the transport of sediment into surface waters.

On-Site Liquid Waste Disposal

New Mexico has expressed significant concern regarding the impairment of surface and ground water from on-site liquid waste disposal systems. In response to this concern, NMED, through State funding,

operates a statewide liquid waste regulatory program designed to address concerns through inspection and enforcement activities. Details of this effort are described elsewhere in this chapter.

Consistency Reviews

The NMED Watershed Protection Section coordinates consistency reviews of federal, State and local projects. Environmental impact statements, environmental assessments, and various notices of intent are reviewed by NMED staff to determine consistency with the State's NPS program and appropriate comments are directed to the agencies. This insures that water quality concerns are analyzed early in the process so as to positively influence agency activities for the protection of water quality.

Cooperation between NMED and the five USFS systems within New Mexico continues. The USFS, recognizing that many forest activities have the potential to impact water quality, continues to develop and implement BMP's designed to mitigate impacts and reduce NPS pollution. NMED's involvement in the planning and development phases of forest activities has increased. In January 1996, NMED opened a NPS Section office in Silver City, which is located in the southern part of the State. This office, among other duties. handles consistency review for the Lincoln and Gila National Forests.

Examples of projects evaluated include ski area activities, timber sales, CWA §§401/404 Dredge-and-Fill permits, grazing permit renewals, recreational development or management, wildfire rehabilitation, watershed improvements, and fish habitat improvements.

Under Work Element 13 of the New Mexico Statewide Water Quality Management Plan, Federal, State and Local Government Agencies have been designated management responsibilities for lands and water quality standards compliance within their jurisdictions. With each designation, constituent agencies of the Water Quality Control Commission are assigned as recipients of reports designed to communicate information and data on BMP implementation. Designated agencies have agreed to coordinate with the assigned constituent agencies in the development and implementation of BMPs.

Work Element 13 has been amended in 1999 to include the City of Rio Rancho as a Designated

Management Agency. The entire management plan is now in the process of being reviewed and preparations are being made to have the amended plan before the WQCC in the calendar year 2000.

Education And Outreach

The Watershed Protection Section conducts education and outreach activities related to nonpoint source pollution and its control. Through development and distribution of brochures relating to nonpoint source pollution, set up of displays, presentations, water camps, water quality sampling training and field trips, the Outreach Program has been able to reach a wide audience with information about NPS pollution and the use of best management practices (BMPs). The Outreach Program has developed slide presentations, several brochures, and three 3-dimensional models for use in outreach activities. In addition, *Clearing the Waters*, NMED's NPS pollution newsletter is published quarterly.

Watching Our Waters

The *Watching Our Waters* (WOW) program forms and coordinates volunteer surface-water monitoring throughout New Mexico. This program is intended for concerned citizens with a genuine interest in streams, but not necessarily with a formal education or professional training. These citizens learn more about our water resources and how they can help prevent pollution at the grassroots level. The program encourages local stakeholders to engage in joint fact-finding, perhaps leading to consensus-bulding. Additionally, the program generates data useful to technical staff charged with evaluating stream resources. SWQB staff review these data for evidence of stream standard violations and other findings. The WOW is administered within SWQB and is conducted under an EPA-approved Quality Assurance Project Plan.

Watershed Efforts

As part of New Mexico's Nonpoint Source Management Plan, addressing NPS impacts within specific watersheds continues to be a primary focus. Such watershed efforts are currently active for the following rivers: Ruidoso, Gila/San Francisco, Mimbres, Gallinas, Rio Puerco, Red River, and Rio Embudo. In addition, watershed organizational work-shops and citizen monitoring groups have been established with the

CWA § 104(b)(3) "*Watching Our Waters*" program cited above.

In order to help meet the goals of the Clean Water Act, states were directed, in 1998, through the Clean Water Action Plan (CWAP) to identify and prioritize watersheds with water quality problems. The SWQB and Natural Resources and Conservation Service (NRCS) developed a cooperative approach to initiate this effort by inviting federal agencies, state agencies, local governments, tribes and pueblos, soil and water conservation groups, industry representatives, environmental groups, etc. to participate in the development of the Unified Watershed Assessment (UWA) for New Mexico. Utilizing the USGS 8-digit system of watershed delineation, the UWA identifies the following four categories of watersheds:

Category I

Watersheds in Need of Restoration ~ watersheds do not now meet, or face imminent threat of not meeting, clean water and other natural resource goals;

Category II

Watersheds Meeting Goals, Including Those Needing Action to Sustain Water Quality ~ watersheds meet clean water and other natural resource goals and standards and support healthy aquatic systems. All such watersheds need the continuing implementation of core clean water and natural resource programs to maintain water quality and conserve natural resources;

Category III

Watersheds with Pristine/Sensitive Aquatic System Conditions on Lands Administered by Federal, State, or Tribal Governments ~ watersheds with exceptionally pristine water quality, other sensitive aquatic system conditions, and drinking water sources that are located on lands administered by federal, state, or tribal governments; and

Category IV

Watersheds with Insufficient Data to Make an Assessment ~ watersheds lack significant information, critical

data elements, or the data density needed to make a reasonable assessment at this time.

The participants of this process provided data and input as to how watersheds in New Mexico would be ranked within these four categories. Watersheds within the Category I classification were further prioritized for restoration and protection efforts.

Invasive Plant Control

Salt cedar invasion into New Mexico stream systems has emerged as a significant non-point sources of pollution. Originally imported to the state to stabilize stream banks, salt cedar occupies the lower reaches of all of the states major water ways.

A phreatophyte with no biological controls, salt cedar consumes high volumes of water through evapotranspiration. Transpired water forms a gentle mist of salt laden vapor that eventually renders the habitat useless for all other riparian vegetation. Salt cedar increases the salinity of surface flows and significantly reduces those flows.

SWCD are actively engaged in salt cedar eradication and native riparian plant restoration demonstration projects that have proven successful in the last three years and are in the process of seeking funding and partners to expand efforts in the other infested stream segments in the state.

While less problems are faced with other noxious weeds, SWCD are involved with control programs to insure retention of native vegetation best suited to control nonpoint sources of pollution.

FEDERAL PROGRAMS

Department of Energy Environmental Oversight and Monitoring Program

On June 27, 1989, the Secretary of Energy announced a 10-point initiative that addressed the need for the DOE to improve its accountability concerning public health, safety and environmental protection by allowing states hosting the DOE facilities direct access to those facilities and by financially underwriting the costs of State oversight of DOE environmental monitoring programs. As a result of this initiative, the DOE entered several agreements, collectively known as the Agreements-In-Principle (AIP) with various states

including New Mexico. The New Mexico agreement is comprehensive in scope and establishes many actions that are to be performed either jointly or separately by DOE and State agencies and organizations. The New Mexico Environment Department (NMED) is the state's designated lead agency for the agreement.

The four DOE facilities in New Mexico are Sandia National Laboratories (SNL) and the Lovelace Respiratory Research Institute (LRRI), formerly the Inhalation Toxicology Research Institute (ITRI) in Albuquerque, the Los Alamos National Laboratory (LANL) in Los Alamos and the Waste Isolation Pilot Plant (WIPP) in Carlsbad. The New Mexico Agreement-in-Principle is designed to help assure that activities at DOE facilities are protective of the public health and safety and the environment. To accomplish the goals of the agreement, an oversight program was developed with four primary objectives:

. To assess the DOE's compliance with existing laws including regulations, rules, and standards;

. Prioritize cleanup and compliance activities;

. Develop and implement a vigorous program of independent monitoring and oversight; and

. To communicate with the public so as to increase public knowledge of environmental matters about the facilities, including coordination with local and tribal governments.

The DOE Oversight Bureau carries out the oversight and monitoring activities of the program. Although the Oversight Bureau has no regulatory status, it facilitates compliance with applicable environmental regulations by reporting water quality concerns and infractions to DOE and the appropriate regulatory NMED Bureaus (i.e., Surface Water Quality, Ground Water Quality, and Hazardous ~~& Radioactive Materials~~**Waste**). DOE Oversight Bureau staff communicate routinely with the public to increase public knowledge of oversight, monitoring, and environmental issues involving the facilities. The Oversight Bureau issues quarterly and annual implementation reports to the DOE describing the scope of work, objectives, accomplishments and significant issues that occurred during each period. Results of oversight and monitoring activities are also available to the public along with numerous documents transmitting technical comments and concerns relative to specific program areas. These reports and documents are a source of re-

liable technical information for the writers of facility proposals and decision makers at regulatory agencies.

~~Surface Water Protection at DOE Facilities~~

In its efforts to protect the waters of the State, the DOE Oversight Bureau monitors and assesses DOE compliance with WQCC regulations, all water quality stream standards and NPDES permitting under the federal CWA.

The DOE Oversight Bureau reviews all activities at DOE facilities for their impacts on New Mexico's surface waters. These reviews include both point source and nonpoint source control efforts. DOE Oversight Bureau's activities with water quality monitoring programs include, but are not limited to, inspections, document verification/ validation and field monitoring. The DOE Oversight Bureau also responds to and investigates spills or releases that enter or have the potential of entering a watercourse.

The DOE Oversight Bureau has collected samples of aquatic benthic macroinvertebrates from streams and springs located in DOE facilities, including neighboring Pueblos, to determine the biological condition of surface waters in and around DOE facilities. Data from initial sampling will provide baseline information on surface water biological communities and reference conditions for the comparison of neighboring watersheds. An extensive database of habitat assessment and associated macroinvertebrate community metrics will aid in these assessment of future changes in the biological communities.

13.2 Programs Addressing Non Point Source Pollution

Since 1988, New Mexico has been increasingly active in addressing nonpoint source pollution. Several agencies, such as the Soil & Water Conservation Districts (SWCD), State Land Office (SLO), State Parks Division (SPD), the State Highway & Transportation Department, the Natural Resources Conservation Service (NRCS), the United States Forest Service (USFS), and the Bureau of Land Management (BLM) are routinely including water quality BMPs to control nonpoint source pollution in their activities due to these efforts. The SWCD, NRCS, and USFS in conjunction with NMED have also initiated several major watershed restoration projects specifically aimed at NPS pollution abate-

ment.

Additional programs initiated by the SLO include a riparian improvement program (RIP) whose purpose is to identify, prioritize, and implement restoration projects in riparian areas and associated watersheds located on state trust lands in cooperation with lessees, adjoining land owners, and land management agencies. The SLO has also initiated a program to identify and control noxious weeds found on state trust lands. The program relies on cooperative efforts with land management agencies, county governments, and other interests to prevent to the extent possible the spread of noxious weeds and the consequent loss of productive agricultural lands.

The USFS has also initiated several major watershed restoration projects specifically aimed at NPS pollution. Since NPS pollution often occurs in discrete episodes related to precipitation events, it is difficult to assess the effectiveness of these controls using only traditional chemical water quality parameters. Simply stated, it is rare that staff would be in the right place at the right time to be able to sample the runoff from these precipitation events. Therefore, NMED is developing physical and biological indicators of water quality in order to monitor and evaluate nonpoint source control activities. Ultimately, the State will have measurable physical and biological water quality standards.

WATER QUALITY IMPROVEMENTS

Since many of the State's high quality waters exist in areas managed by USFS, management changes and BMP implementation in many of these areas results in a rapid benefit even though the State does not always have the necessary data to establish statistical correlation between the implementation of BMPs and an improvement in water quality. In many instances, changes in management practices will not be immediately evident, due to slow vegetative growth rates and other ecological factors. Actual improvements within the water column may not be noticeable for years, and possibly even decades. Due to this "ecological lag time," NMED is exploring the use of other indicators of improvement. NMED has begun to develop protocols for assessing sedimentation through the use of biological and geomorphological methodologies. NMED

also recognizes the need for and plans to develop protocols for assessing riparian areas and how they influence water quality.

~~PROGRAMS FOR WATER QUALITY ASSESSMENT~~

~~Water quality assessment is an integral part of water quality management in New Mexico. Information on water quality serves as a basis for various program decisions. Moreover, statewide assessments of surface and groundwater quality are an important component of this federally-required report. Monitoring activities and programs used by New Mexico to assess ground and surface water quality are described below.~~

~~Surface Water Quality Assessments~~

~~The State uses a wide variety of methods for assessment of its water quality. Second-party data including discharger's reports, published literature, data stored in the United States Environmental Protection Agency's (EPA's) database, as well as data generated by the United States Geological Survey (USGS) are routinely reviewed. The New Mexico Environment Department (NMED) generates large amounts of data through intensive surveys, assessment of citizen complaints, special studies aimed at areas of special concern (e.g., mercury concentration in water, sediments and fish), short- and long-term nonpoint source pollution monitoring, and effluent monitoring.~~

~~Surface Water Quality Monitoring~~

~~Water quality monitoring and other surveillance activities provide water quality data needed to (1) revise water quality standards, (2) establish waterbody monitoring/management priorities, (3) develop water quality-based effluent limitations, (4) develop total maximum daily loads (TMDL), (5) assess the efficacy of point source water pollution controls through the National Pollutant Discharge Elimination System (NPDES), (6) identify new areas of concern such as the statewide fisheries mercury study, and (7) evaluate the efficacy of best management practices (BMPs) developed to mitigate the impact of nonpoint sources.~~

~~Water quality data are acquired by four basic forms of monitoring: (1) ambient, fixed station moni-~~

toring performed by the USGS; (2) special water quality surveys of priority waterbodies by NMED; (3) effluent monitoring; and (4) NMED special studies.

Stream Monitoring

Ambient Monitoring

In addition to intensive and special water quality surveys, the Surface Water Quality Bureau has for many years relied on water quality data collected by the United States Geological Survey from a series of long-term fixed stations. Through 1995 the USGS maintained a network of 49 long-term fixed stations, located in almost every watershed in the State. The primary objective of this fixed station network has been to provide long-term measurements of water quality variables at representative points on the State's major streams to determine spatial and temporal water quality trends. These data are also used for determining TMDLs for these waterbodies as required. Prior to 1996 the funding for this sampling effort was provided by an appropriation from the Legislature to the State Engineer Office, along with an equal match from USGS. In June 1996 the State Engineer Office withdrew all future funding for water quality data collection and concentrated on funding the stream flow studies. The Surface Water Quality Bureau reviewed the fixed-station network of stations compared to the upcoming TMDL commitments and recommended a modified work plan involving 13 stations. Funding is provided by the New Mexico Legislature on a year-to-year basis and the future of fixed-station monitoring in New Mexico is in doubt.

In addition to the 13 fixed-station water quality stations maintained by USGS there is one additional station yielding valuable water quality data for the State. This stationis part of the National Stream Quality Accounting Network (NASQAN) and is located on the Rio Grande in Texas just outside the New Mexico state boundary. Locations of the fixed water quality network in the State, parameters sampled, frequency of sampling and other related information are presented in Figure 20 and Table 20 in Appendix D.

Special Stream Surveys

Special water quality surveys involve three seasonal sampling trips or eight one-day sampling trips

spread out through the three seasons. During each seasonal trip water quality samples are collected and measurements are made of physical parameters at representative points along a stream reach. The purpose of these investigations is to determine water quality characteristics under specific conditions, and to determine where possible, cause and effect relationships of water quality.

Special surveys are usually timed to include periods of stress for the fish and macroinvertebrates of the waterbody, such as periods of annual low streamflow or highest ambient temperatures. Stream surveys conducted during 2000 and 2001 are listed in Table 13. Benthic macroinvertebrate assessments to evaluate the integrity of aquatic communities were conducted in association with most of these stream surveys. Parameters sampled during special surveys are listed in Table 21 of Appendix D.

The Surface Water Quality Bureau is currently attempting to conduct water quality sampling efforts in each of the State's watersheds every seven years.

Lake and Reservoir Monitoring

Lake and reservoir monitoring in New Mexico is conducted to (1) collect information for standards development and to determine the trophic status for all publicly-owned or operated lakes where little or no physical, chemical, or biological information exits; and (2) update information with regard to trophic status of previously studied publicly-owned lakes. Lake water quality status, control measures, restoration efforts, and the status of mercury in lakes and reservoirs are discussed under Chapter Three, *Water Quality in Assessed Surface Waters*.

Lakes sampled during 2000 and 2001 are listed in Table 13. These special lake surveys consisted of three-season sampling efforts from one or two stations. Summer surveys were also conducted on additional lakes. The surveys for these small lakes were conducted during the period of maximum stress to the aquatic ecosystem.

Effluent Monitoring

Receiving streams are **periodically** sampled in conjunction with effluent samples collected during

~~Compliance Sampling Inspections at NPDES permitted discharge facilities. Inspectors collect samples from the discharge pipe as well as from an upstream station and a downstream station, to bracket the discharge. This group of samples provides information on the impact, if any, of the discharge on the chemical quality of the receiving stream. The information can be used to determine if water quality standards are being violated as the result of a point source discharge. The data also provide information necessary for the preparation of NPDES water quality based permit effluent limitations.~~

~~NMED Special Studies~~

~~Nonpoint Source Monitoring~~

~~Under the Nonpoint Source Management Program, NMED conducts extensive water quality monitoring around the State to determine the effectiveness of BMPs used to control nonpoint source (NPS) pollution. Monitoring is also conducted in conjunction with targeted watershed demonstration projects. Intensive implementation of BMPs is ongoing in these watersheds to improve water quality. On a statewide basis, NMED monitors selected projects in priority waterbodies such as timber harvests, road construction and dredge and fill activities to determine the effectiveness of BMPs used to protect water quality in these projects.~~

~~NPS monitoring typically includes determinations of whether BMPs are being implemented as planned, and water quality sampling upstream and downstream of actual or potential NPS problem areas. In the case of short term projects such as a utility line crossing of a river, monitoring may be done only once or twice during the project. In these projects, turbidity monitoring is often used as an indicator of erosion control effectiveness on the project. If turbidity standards are violated, additional water quality parameters may also be checked.~~

~~In the case of monitoring watershed improvement projects, samples are collected seasonally over a multi year period. Water quality is monitored upstream and downstream of all major NPS problems and control BMPs implemented in the watershed. Sampling repeatedly over a multi year period will allow the~~

State to document the effectiveness and feasibility of watershed restoration projects in improving water quality. As discussed previously, other indicators of improvement are being developed and implemented.

Future Directions

Monitoring and Evaluation of Nonpoint Source Controls

Since 1988, New Mexico has been increasingly active in addressing nonpoint source pollution. Several agencies, such as the Soil & Water Conservation Districts (SWCD), State Land Office (SLO), State Parks Division (SPD), the State Highway & Transportation Department, the Natural Resources Conservation Service (NRCS), the United States Forest Service (USFS), and the Bureau of Land Management (BLM) are routinely including water quality BMPs to control nonpoint source pollution in their activities due to these efforts. The SWCD, NRCS, and USFS in conjunction with NMED have also initiated several major watershed restoration projects specifically aimed at NPS pollution abatement.

Additional programs initiated by the SLO include a riparian improvement program (RIP) whose purpose is to identify, prioritize, and implement restoration projects in riparian areas and associated watersheds located on state trust lands in cooperation with lessees, adjoining land owners, and land management agencies. The SLO has also initiated a program to identify and control noxious weeds found on state trust lands. The program relies on cooperative efforts with land management agencies, county governments, and other interests to prevent to the extent possible the spread of noxious weeds and the consequent loss of productive agricultural lands.

The USFS has also initiated several major watershed restoration projects specifically aimed at NPS pollution. Since NPS pollution often occurs in discrete episodes related to precipitation events, it is difficult to assess the effectiveness of these controls using only traditional chemical water quality parameters. Simply stated, it is rare that staff would be in the right place at the right time to be able to sample the runoff from these precipitation events. Therefore, NMED is developing physical and biological indicators of water quality in order to monitor and evaluate nonpoint source control activities. Ultimately, the State will have meas-

urable physical and biological water quality standards.

Table 13. Special Stream Surveys, 2000 - 2001.

Dry Cimarron River Watershed	Rio Chama Watershed, to El Vado	Rio Grande Watershed, Pilar to Colorado
Gila River Watershed	Rio Grande, Jemez to Isleta	Santa Fe River
Mimbres River Watershed	Red River Watershed	

Special three-season intensive water quality lake surveys

Clayton Lake	Abiquiu Reservoir	Santa Rosa Lake
Santa Cruz Reservoir	Storrie Lake	McAllister Lake

Single-season intensive water quality surveys were conducted on the following three lakes:

Monastery Lake
Playa Lakes
Blue Hole

PROGRAM EVALUATION

Various qualitative and quantitative measures have been used by the United States Environmental Protection Agency (EPA), the states, and others to measure the effectiveness and accomplishments of water quality management programs. This section discusses measures that provide an evaluation of the overall effectiveness of programs for ground and surface water quality management.

Costs of Surface Water Quality Programs

The costs of administering surface water quality programs in New Mexico reached almost $5 million in combined federal and State funds in the current State fiscal year (July 2001-June 2002). The State's responsibilities in several areas of concern have significantly grown as a result of documentation of problems by the New Mexico Environment Department (NMED), increased public perceptions of water quality problems, and federal mandates, especially nonpoint source control efforts.

The major expenditure under these programs in 1996-1997 has been for the construction of municipal wastewater treatment facilities under the State revolving loan program. Established in 1986, this program to date has provided loans worth over $104 million in combined federal and State funds to local governments. In addition, approximately $48 million in potential loans are currently under negotiation. About $23 million remains in the fund for future loans. Other projects worth over $200 million have been placed on the priority list.

Despite the large amount of money spent on wastewater treatment facilities construction over the last 20 years, recent surveys of wastewater needs and an increased emphasis on water quality impacts from other pollution categories show that many additional needs remain.

Value of Designated Uses

The primary function of surface water quality management programs is maintenance of suitable water quality to protect existing, designated and attainable uses. These uses produce important economic and social benefits to many disparate groups. Protection of the domestic water supply use produces important

direct public health benefits to riverside residents, hikers, and campers. Protection of the municipal water supply use prevents additional treatment costs to municipalities. Irrigated agriculture and grazing provide the economic and social bases for many small communities in New Mexico; thus, the irrigation and livestock grazing uses produce economic benefits not only for farmers and ranchers, but also spin off additional economic benefits to farm service establishments. The recreational use of streams and lakes in New Mexico produces economic and social benefits for both New Mexicans and residents of nearby states. While many of these uses generate direct economic benefit, it is important to note that the fishing use, which is the most dependent of all uses on clean water, generates over $232 million annually in such direct economic benefits **(WQCC 1999~~14~~)**.

NPDES Permit Compliance

Since passage of the federal Clean Water Act (CWA) in 1972, municipal compliance in New Mexico has increased dramatically (Figure ~~11~~**4.10**). Under its National Municipal Policy, EPA set a compliance deadline of July 1, 1988**,** for municipalities to achieve secondary treatment capability or to be on an enforceable schedule toward this goal. The State of New Mexico, in terms of the National Municipal Policy, was one of eight states in the nation, and the only state in EPA Region VI, to attain a 100 % compliance by the 1988 deadline. However, this does not mean that there are no compliance problems. Improper operation and maintenance of treatment works and, in some cases, effluent quality violations still exist. In 1987, Congress authorized EPA to assess administrative penalties for violations of the CWA. Since that time, EPA has assessed administrative penalties totaling $~~699,500~~**1,362,318**. EPA continues to issue Administrative Penalty Orders.

~~Since 1987 two facilities, one major municipal and one private domestic utility paid an administrative penalty of $125,000 each, which is the maximum currently allowable under the administrative penalty authority.~~ Figure ~~12~~ **4.11** shows the distribution of EPA's administrative penalty orders by the penalty amount. The above administrative penalties are in addition to numerous EPA Administrative Orders which also ad-

dress permit violations of lesser magnitude. Between ~~1999~~**2001** and 200~~0~~**3**, EPA issued numerous administrative orders and ~~15~~**9** administrative penalty orders in New Mexico.

~~EPA prioritizes its enforcement efforts to emphasize facilities classified as "major." Consequently, compliance information regarding "minor" facility compliance is not as clear nor as measurable as that for "major" facilities.~~

In the past, EPA has been reluctant to initiate enforcement against any minor facility. However, in recent years,Region VI of EPA has begun taking more action against "minors" violating NPDES conditions. The State's experience in performing NPDES compliance inspections for EPA indicates that "minor" facilities commonly have non-compliance problems which need to be addressed.

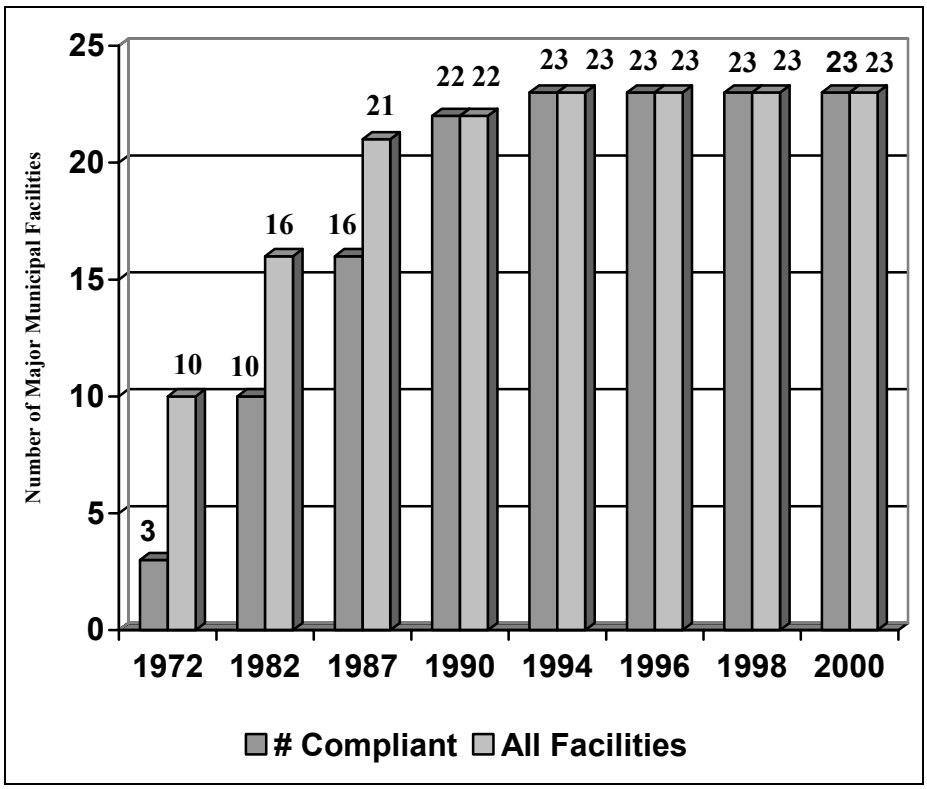

Figure ~~11~~4.10. Number of Major Municipal NPDES Permitees in New Mexico Achieving Secondary Treatment by Year.

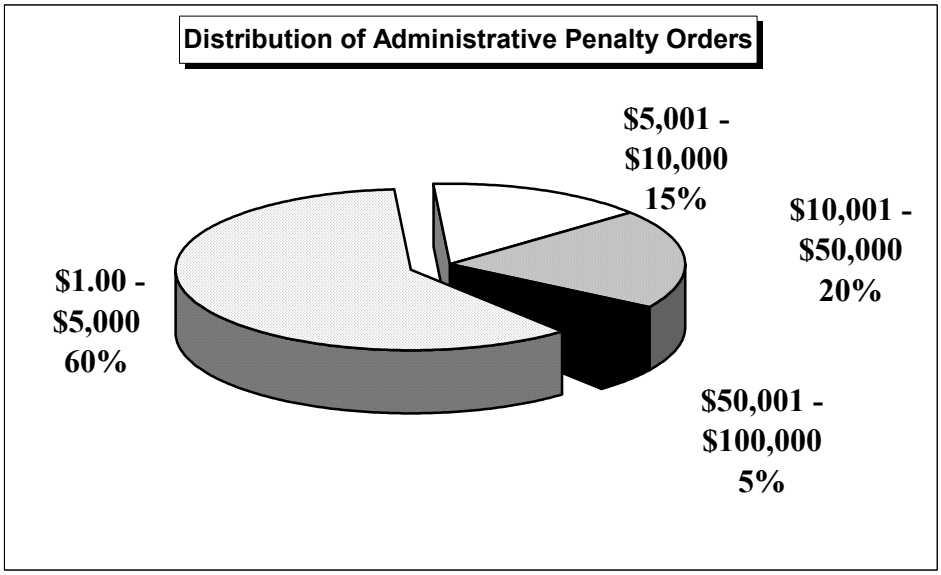

Figure ~~12~~4.11. Distribution of Administrative Penalty Orders Issued by the EPA by Amount of Penalty.

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